



LUNAR
Brighton Secondary Schools 2024
F1 in Schools World Finals
3rd Overall

2025

Competition Regulations

Development & Professional Classes

Version 1.0



Managed by

Re-Engineering Australia
Foundation



Luna - Brighton Grammar Schools Victoria - 2024 F1 in Schools National Champions & 3rd Outright F1 in Schools World Finals -Saudi Arabia
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ACKNOWLEDGEMENT

In preparing the STEM Racing 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 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 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 season and V1.0 of this season are identified within the document by using red underlined text.

All changes between V1.0 of this season and V2.0 are identified within the document by using green underlined text.

All changes between V2.0 of this season and V3.0 are identified within the document by using blue underlined text. These regulations will be valid for all 2024 State Finals and the 2025 National Final. Some changes **MAY ONLY** be valid for National Finals.

ARTICLE C1 -

DEFINITIONS

- C1.1.6 *NEW* definition of Booth Space replaces Booth Shell.
- C1.1.7 Updated Trade Display wording.
- C1.1.9 Updated wording to reflect Manual Racing only.

ARTICLE C2 -

GENERAL REGULATIONS

- C2.1.3 Updated to reflect Dev National Champions attending World Final as stand-alone team.
- C2.8.5 Updated to require use of Registered symbol and NOT the Trade Mark symbol.
- C2.9.2 Wording and penalty points updated for late submission of project elements.
- C2.9.4 *NEW* wording covering plagiarised or AI portfolio content removed from assessment.
- C2.10 Requirement for the inclusion of an isometric render in uploaded files.
- C2.12.2 Changes to car ballasting conditions and addition of penalty.

ARTICLE C3 -

COMPETITION AND JUDGING FORMAT

- C3.7 Upgrade of Portfolio Design points from 50 to 60.

ARTICLE C4 -

SPECIFICATIONS JUDGING - Nil changes.

ARTICLE C5 -

ENGINEERING JUDGING - Nil changes.

ARTICLE C6 -

POSTER JUDGING - REMOVED

ARTICLE C7 -

PORTFOLIO JUDGING

- C7.1.8 *NEW* penalty uploading portfolios to School Turnitin Accounts.
- C7.1.9 *NEW* penalty for teams not including their Team Name on portfolio cover/s.
- C7.2.1 *NEW* PMI Project Management criteria. [PMI Guide Link](#).
- C7.2.2 Updated Portfolio Design criteria and points.

ARTICLE C8 -

MARKETING JUDGING

- C8.3.4 Updated wording and inclusion of *NEW* rules around finished appearance and team name.
- C8.4.1.2 - C8.4.1.4 Updated wording.
- C8.4.1.6 Updated dimension for packaged items maximum volume.
- C8.5.1 *NEW* regulation for provision of floor area only which replaces previously allocated walling.
- C8.5.2 Updated regulation relating to non-provision of trestle tables and their inclusion for C8.4.1.5.
- C8.5.3 *NEW* regulation concerning minimum dimensions for viewing of external structures.
- C8.6 Updated condition and two *NEW* conditions relating to clear perimeters and structural integrity.
- C8.6.1 One updated penalty and two *NEW* penalties relating to team name and overheight displays.

ARTICLE C9 -

VERBAL PRESENTATION JUDGING - Nil changes.

ARTICLE C10 -

RACING

- C10.2 Automatic Racing removed.
- C10.3 Minor wording updates to Racing Procedure.

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 Project Management and Branding criteria.
- APPENDIX 2 Nil changes.
- APPENDIX 3-4 Updated Project Management wording.
- CRITERIA 1 Updated to include introduction of halo.
- CRITERIA 2-4 Nil changes.
- CRITERIA 5 Updated Project Management criteria and points allocation. Text for Criteria 5.4 Advanced Range corrected.
- CRITERIA 6 Updated Portfolio Design criteria and points allocation.
- CRITERIA 7 Updated wording for Criteria 7.7.
- CRITERIA 8 Updated points allocation and removal of ICT criteria.
- CRITERIA 9-10 Nil Changes

ARTICLE C1 - DEFINITIONS

C1.1 Australian Competition Season

The standard sequence of Australian F1 in Schools competitions run across two calendar years. The State Finals held Sept/Oct/Nov in one year will feed to the National Final in March/April/May of the following 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.

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 & National Finals

State and National 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. Specifically, the competitions aim to identify and prepare teams to represent Australia at the F1 in Schools World Finals.

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

C1.5 World Final Competition

The Australian National Final will feed into a World Final, the timing of which will depend upon the country hosting the event. For teams aspiring to represent Australia at the World Final, please be aware that the World Final Competition Regulations are different to the Australian Competition Regulations.

C1.6 STEM Racing National Coordinator / In Country Coordinator

A person employed by Re-Engineering Australia Ltd. (REA) to manage the F1 in Schools competition in Australia on behalf of F1 in Schools Ltd. UK and to identify, manage and co-ordinate teams nominated to represent Australia at the F1 in Schools World Final.

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 & B are held to prevent unauthorised handling, but to allow technical inspections to be conducted by the Judges. (Literal meaning in French of 'closed park').

C1.9 REA Event App

Each team, supervising teacher and judge will 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 or National Final. Copies of all forms can be found within the Resources tab within the F1 in Schools menu of the REA Foundation Ltd. website. For detailed information refer to ARTICLE C2.4.

World Final representative teams will also be required to sign a separate Participation Agreement.

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 STEM Racing™ **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 is the actual time taken for a STEM Racing 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.

C1.16 Booth Floor Area

A booth floor area of 2000mm x 1000mm will be allocated to teams for erection of their trade display. A clear perimeter of a minimum 600mm will be provided on the rear and both sides. The primary viewing of the display SHOULD be from the front 2000mm wide edge.

C1.17 Trade Display

A Trade Display is the final product that teams assemble upon a provided booth floor area over a 2 hour assembly period. This contains all of the structural and visual elements presented for judging.

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 Mode

Manual Launch (Reaction) Racing **only** is used at Australian State and National Final competitions.

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 some competition regulations governing Portfolio or Trade Display restrictions and 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 or National 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 three competition classes in the Australian F1 in Schools competition with some having Junior and Senior categories defined by school year levels:

C1.23.2 Development Class (3 - 5 team members)

Students **MAY ONLY** participate in the junior division once. The junior division **ONLY** provides either an international or internal collaboration team pathway to the World Final.

C1.23.2.1 Primary: Years 5 - 6

C1.23.2.2 Junior: Years 7 - 9

C1.23.3 Professional Class (3 - 5 team members)

Open to all students but usually **ONLY** entered by students in Years 7 - 9 who have competed in the Cadet or Development classes previously. The overall National Champion Professional Class team will represent Australia as a 'stand-alone' team at the World Final.

C1.23.3.1 Junior: Years 7 - 9

C1.23.3.2 Senior: Years 10 - 12

C1.24 Virtual Events

SHOULD the need arise to run virtual or hybrid State or National 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

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 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 STEM Racing menu on the REA Foundation Ltd. website.

The best Development Class, Professional Junior Class and Professional Senior 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 Professional Junior and Professional Senior Class teams into one overall Professional Class if representative numbers in these classes are five or less.

C2.1.2 National Final

At each State Final, the champion Development, Professional Junior and Professional Senior Class teams and their supervising teachers (2 maximum) will be **invited** to represent their state at a National Final so long as they achieve the minimum 60% requirement as per ARTICLE C14.4 (1).

At National Finals, the Professional Junior and Professional Senior Class teams will be combined into one overall Professional Class.

REA Foundation Ltd. reserves the right to offer 'Wildcard' invitations to selected teams. The number and criteria for selection is at the discretion of REA Foundation Ltd. and is **NOT** necessarily based on final rankings. Teams receiving wildcard invitations will be notified in writing within 7 days of the conclusion of the State Final.

C2.1.3 World Final

The Development Class and **overall** Professional Class National Champions and their supervising teachers (2 minimum) will be invited to represent Australia at a World Final.

The Development Class and overall **Professional Class** National Champions will represent Australia as '**stand-alone**' teams of up to six (6) team members.

The ICC **MAY** offer 'wildcard' invitations to selected National Final teams. The number of wildcard positions available is determined by the World Final organisers but the criteria for selection is at the discretion of REA Foundation Ltd. and is **NOT** necessarily based on final rankings. Teams receiving wildcard invitations will be notified in writing within 7 days of the conclusion of the National Final. The structure of these teams **MAY** include internal or international collaboration arrangements. **ALL** teams accepting selection for World Finals **MUST** sign a Participation Agreement prepared by REA. This is **NOT** negotiable.

C2.1.4 Returning World Final Teams

ANY World Final representative team wishing to return to the Australian Competition will be provided with automatic entry to the National Final immediately following the World Final so long as at least 50% of the team membership remains in place. ARTICLE C2.3.11 does **NOT** apply. Team Registrations **MUST** be submitted by the due date and fees still apply.

C2.2 Cost of Participation

C2.2.1 State and National Finals

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. Some meals **MAY** be provided to teams and teachers at National Finals.

C2.2.2 World Final

World Final teams **WILL** be required to raise all sponsorship / funding required for travelling to and participating in the World Finals. Participation Fees are levied by the organisers of a World Final. Some government funding **MAY** be available to teams but it is the teams' responsibility to source and apply for this funding.

[Advice]

C2.3 Team & Project Entry Conditions

C2.3.1 Varying the Conditions

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

C2.3.2 Team Membership

Each team registered in the Australian competition **MUST** consist of the following minimum and maximum number of students. Mixed gender teams are encouraged.

C2.3.2.1 Development: 3 to 5 team members.

C2.3.2.2 Professional: 3 to 5 team members.

C2.3.2.3 Collaboration Teams: 4 to 6 team members.

C2.3.3 Collaboration Teams

These teams will **ONLY** be formed from State Final teams at the invitation of REA Foundation Ltd. for National Final events. A maximum of 2 schools can participate with balanced representation from each school.

C2.3.4 Supporting or Affiliate Team Members

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

C2.3.5 Development Class Entry Requirements

A student in the junior division, **MAY ONLY** compete in the Development Class once and **ONLY** if they have have **NOT** competed in the Professional class previously.

C2.3.6 Professional Class Entry Requirements

C2.3.6.1 A team **MUST** be classified as a Professional Class Team (Senior or Junior) if it has **ANY** member who has participated in F1 in Schools previously in the Development or Professional Classes.

C2.3.6.2 A team **MUST** be classified as a Senior Professional Class Team if it contains **ANY** member who is in Year 10 or above.

C2.3.7 Multiple Class Entry Restrictions

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

C2.3.8 Enrolled Full-time Students

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 National and World Final competitions. Exceptions will be made if World Finals are postponed to the year following the Australian National Final and representative team members have completed their schooling. However in this situation, team members are only eligible to compete at a World Final if their age is a maximum 19 years during the entire course of the event.

C2.3.9 Team Registration Conditions

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 and National Finals.

C2.3.10 Team Membership Changes

Each team **MAY ONLY** make one change (i.e. add, subtract or substitute) to its membership when progressing to the next level of competition. REA Foundation Ltd will consider up to two team membership changes between a State and National Final when extenuating circumstances exist and upon written request to the Rules Committee.

C2.3.11 Changes to Team Classification

When progressing from State to National 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.

C2.3.12 Entered Cars

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. (Teams developing cars for a World Final event **MUST NOT** enter these cars in Australian competitions.)

C2.4 Competition Procedural Regulations

C2.4.1 Submitting Documentation

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

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 and International Competition Season.

C2.4.1.2 Media Consent Form

- One per student.
- Valid for the entire Australian and International 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.

C2.4.1.3 Development Class Declaration Form

This form is **electronically signed** by teachers when they register their Development Class team on-line. Teachers **MUST** be aware of and agree to the special conditions for Development Class teams before enabling the check box in the on-line registration form.

C2.4.1.5 Grievance Form

- 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.Student Code of Conduct Form** [Eligibility]
- One per team.
- Valid for the entire Australian and International 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.

C2.4.1.6 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

All teams **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 or National Final. At this check-in, teams will be issued with State or National Final accreditation.

C2.4.2.2 Submitting Project Elements

When checking in at State Finals and National 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

At State and National Finals, **ONLY** members of the official competing team are permitted to wear a team uniform.

C2.4.4 Collaboration Team Awards

If a **collaboration** team wins an award at a National Final which involves a perpetual trophy, this **MUST** be shared between the team for the 12 months following the event. Award certificates will be duplicated for awards won by collaboration teams.

C2.5 Team responsibilities

C2.5.1 Australian Technical Regulations

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

C2.5.2 Australian Competition Regulations

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

During the competition, **ONLY** the official team members can represent the team at event check-in, trade display set up, verbal presentation, portfolio, marketing and engineering judging, 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

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.

C2.5.5 Trade Display Security

Security of a team's Trade Display and its elements is the team's responsibility during competition. Teams are strongly advised to remove and secure any marketing or other items when they are away from their booth attending judging or other activities.

C2.6 Role and Responsibility of Supervising Teacher.

C2.6.1 Terms and Conditions Form

All supervising teachers **MUST** carefully read and understand the terms and conditions for entry to the STEM Racing State & National Finals events, and must have explained all relevant information within this agreement to their team/s.

C2.6.2 Other Documentation

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

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

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

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

Teams are encouraged to develop mentoring collaborations with individuals from **external** businesses, industry or higher education organisations throughout their project. Teachers and past team members still attending school are not considered mentors for the purpose of Criteria 10.5.

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

[Eligibility]

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, Portfolio, Trade Display 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.

C2.7.4 Documenting Collaborations in Portfolio

Aspects of **ANY** collaborations with external individuals or organisations including **ANY** mentoring, sponsorship (financial and in-kind) and provision of services, **MUST** be represented in the teams Enterprise 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 and services used.

C2.7.5 Purchased Project Elements

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.

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

C2.8.1 REA Corporate Partner Logos

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 two levels of Corporate Partners are clearly identified within the downloadable file.

C2.8.1.1 Level 1 Corporate Partner Logos

These **MUST** be applied to a team's cars, portfolio, trade display and uniform. Car decals for Level 1 REA Corporate Partners are supplied to team immediately prior to the Submission process and **MUST** be applied to both Cars A & B and on identical display cars. Teams are **NOT** permitted to produce their own corporate partner decals. Refer to the Technical Regulations.

C2.8.1.2 Level 2 Corporate Partner Logos

These **MUST** be applied to a team's portfolio and trade display as a minimum.

C2.8.2 FI* in Schools In Country Logo

Teams **MUST** use the STEM Racing Logo with the IN-COUNTRY indicator. No other version of the logo is permitted.



C2.8.3 Formula One® Word Mark Restrictions

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: FI*, Formula One, Formula 1, Grand Prix and FI* in Schools. Registered team names including **ANY** of these marks will be rejected.

C2.8.4 STEM Racing Logo Permitted Use

Use of the STEM Racing 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 cars, portfolios, trade displays and team uniform. If using the STEM Racing logo on Marketing or Sponsorship documents, the following statement **MUST** be included in those documents:

The STEM Racing and related marks are trademarks of Formula One Licensing BV, a Formula One group company. All rights reserved

C2.8.5 STEM Racing™ Word Mark Permitted Use

ANY team using the STEM Racing 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

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

The Australian Government's Department of Defence has provided REA with financial support for STEM Racing since 2008 and more recently SUBS in Schools since 2014. 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]

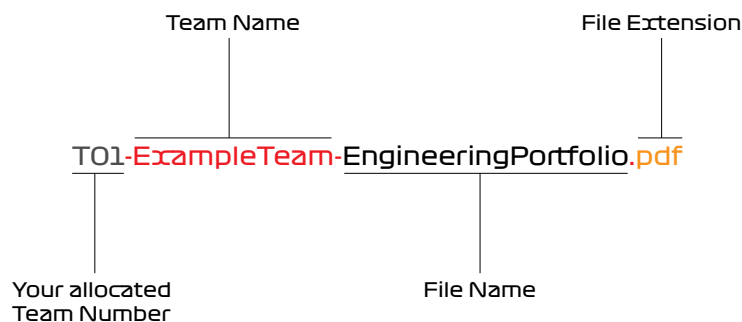
Around two weeks prior to an event, teams will be emailed a unique link to a google drive folder that they will be required to upload their electronic data to. A deadline will be imposed around one week out from the event. Teams will require a google account for uploading of electronic project elements.

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]

- Documentation **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.
- All car renders (maximum of 10 in total) **MUST** be submitted as high quality **PNG** files (maximum 10mb each)

C2.9.2 Late Submission Penalties

C2.9.2.1 Turnitin

[20 Points per day]

A penalty of 20 points per day will be applied for each portfolio, per day or part thereof, not submitted to Turnitin by the published deadline.

C2.9.2.2 REA Google Drive

[10 Points]

A penalty of 10 points per project element will be applied for each file, not submitted to the REA Google Drive by the published deadline.

C2.9.2.3 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.
- Are **NOT** submitted in the correct file format.
- Does **NOT** comply with the required file naming convention

C2.9.3 Digital Upload of Portfolios via Turnitin

[Eligibility]

ALL State or National Final teams will be required to upload their **FINAL** Engineering and Enterprise Portfolios direct to Turnitin by a published deadline.

C2.9.4 Turnitin Procedures for Portfolios

Similarity detection software 'Turnitin' **WILL** be used to check the authenticity of content in all teams' State and National Final portfolios.

Unreferenced content in team portfolios **WILL** be deemed to have been plagiarised and **WILL NOT** be assessed as part of the judging process resulting in zero marks for the relevant criteria.

The Chair of Judges reserves the right to instruct judges to omit from their assessment, portfolio content detected as being plagiarised and/or AI generated.

State and National Final teams **WILL** be given free access to Turnitin software to upload their portfolios and make required changes based on a report of results provided by Turnitin. Multiple uploads can be made to check the authenticity of content in team portfolios.

Judges **WILL** be advised about any issues generated by Turnitin based on the content of the **FINAL** version teams upload by the submission deadline.

C2.9.4.1 Turnitin Document Requirements

Teams need to be aware of the following conditions for uploading portfolios to Turnitin.

- File format **MUST** be a PDF as required by REA.
- File size must **NOT** exceed 100mb
- PDF files **MUST** be editable/highlightable and not a 'scanned' PDF.

C2.10 Mandatory Project Elements Required for Digital Submission

ENGINEERING			
	Project Element	Submission Details	Judging Criteria
<input type="checkbox"/>	Engineering Portfolio	Electronic: PDF format Maximum 100mb file size Submitted to Turnitin	<ul style="list-style-type: none"> • Engineering: Manufacturing • Engineering: Design Process • Portfolio: Design
<input type="checkbox"/>	Separate High Quality Renders (including Isometric)	Electronic: PNG Submitted to REA G-Drive	<ul style="list-style-type: none"> • For use by REA
<input type="checkbox"/>	ALL Engineering CAD Files. (parts & assembly)	Electronic: STEP or STP Submitted to REA G-Drive	<ul style="list-style-type: none"> • For use by REA
ENTERPRISE			
	Project Element	Submission Details	Judging Criteria
<input type="checkbox"/>	Enterprise Portfolio	Electronic: PDF format Maximum 100mb file size Submitted to Turnitin	<ul style="list-style-type: none"> • Portfolio: Project Management • Portfolio: Design • Marketing: Branding
FORMS			
	Project Element	Submission Details	Judging Criteria
<input type="checkbox"/>	Media Consent Form (for each team member)	Electronic: PDF Submitted to REA G-Drive	<ul style="list-style-type: none"> • For use by REA
<input type="checkbox"/>	Student Code of Conduct Form	Electronic: PDF Submitted to REA G-Drive	<ul style="list-style-type: none"> • For use by REA

C2.11 Mandatory Physical Elements required at Event Checkin

ENGINEERING			
	Project Element	Submission Details	Judging Criteria
<input type="checkbox"/>	Engineering Portfolio	1 x A3 printed and bound	<ul style="list-style-type: none"> Engineering: Manufacturing
<input type="checkbox"/>	Engineering Compliance Booklet	1 x A3 printed and bound	<ul style="list-style-type: none"> Engineering: Specifications Engineering: CAD
<input type="checkbox"/>	Optional Testing Document	1 x A3 printed and bound	<ul style="list-style-type: none"> Engineering CAD Engineering Manufacturing
ENTERPRISE			
	Project Element	Submission Details	Judging Criteria
<input type="checkbox"/>	Enterprise Portfolio	1 x A3 printed & bound	<ul style="list-style-type: none"> Portfolio: Design Marketing: Branding
<input type="checkbox"/>	Design Development Brief	1 x A4 or A3 printed & bound	<ul style="list-style-type: none"> Marketing: Trade Display
CARS			
	Project Element	Submission Details	Judging Criteria
<input type="checkbox"/>	Cars	1 x Car A with decals 1 x Car B with decals	<ul style="list-style-type: none"> Engineering: Specifications Racing

C2.12 Other Judging

	Item / Element	Details	Judging Criteria
<input type="checkbox"/>	Car	1 x Display Car with decals	<ul style="list-style-type: none"> Engineering: CAD Engineering: Manufacturing
<input type="checkbox"/>	Trade Display	1 x fully complete display as per the regulations	<ul style="list-style-type: none"> Marketing: Trade Display
<input type="checkbox"/>	Laptop	1 per team , complete with CAD software, optional media presentation, HDMI cable/adaptor and charger.	<ul style="list-style-type: none"> Engineering: CAD Engineering: Manufacturing Verbal Presentation
<input type="checkbox"/>	Internet	Teams provide own internet	<ul style="list-style-type: none"> As required

C2.12.1 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 or National 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.
- Cars A & B once submitted will be placed into Parc Ferme and **NOT** released for **ANY** other judging.

C2.12.2 Legal Ballasting of Race Cars

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.

C2.12.2.1 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.**
 - .

C2.12.2.2 Methods of increasing mass that WILL infringe Technical Regulations

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

C2.13 Project Elements to be Retained by REA Foundation Ltd.

It is a condition of entry to Australian State and National Finals that each team permits REA Foundation Ltd. to retain 1 x race car, usually a nominated race car and 1 x printed Enterprise and Engineering Portfolio. Teams also permit REA Foundation Ltd. to use these project elements for marketing purposes and / or publication as exemplar projects for reference by others.

ARTICLE C3 - COMPETITION AND JUDGING FORMAT

C3.1 Event Information

All event information including the timing and venue for all judging and competition activities will be provided via the REA Event App [or email](#), with access 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.

C3.2.1 Judging Session Timings

Teams will rotate around judging activities as per this judging schedule, with each rotation usually of between 10 – 30 minutes in duration.

C3.2.2 Judging Streams

The judging schedule will normally be divided into two or three parallel judging streams (Stream A, Stream B and Stream C), with each judging stream responsible for a class of competition. 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, particularly where parallel streams exist within a class.

C3.3 Judging Panels

REA Foundation Ltd. always makes every effort to select judges from industry and higher 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.

C3.4 Who attends Judging?

ALL team members **MUST** attend every scheduled judging session as per the Judging Schedule except for Specifications Compliance Feedback if provided. At Specifications Compliance Feedback, the Team Manager, Design Engineer and Manufacturing Engineer **MUST** attend as a minimum. One supervising teacher **MAY** observe judging sessions as per the conditions set out in ARTICLE C2.6.5. This teacher **MUST NOT** directly approach or discuss **ANY** judging matters with the judges at **ANY** time unless invited to do so.

C3.5 Students with Special Needs

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 or National Final, every effort will be made to accommodate the needs of the student.

C3.6 Judging Categories

There are seven (7) main judging categories, each with its own team of judges - where possible - and specified judging activities as detailed in further articles.

- Specifications
- Engineering - CAD & Manufacturing
- Engineering - Design Process
- Portfolio – Project Management & Design Clarity & Quality
- Marketing – Branding & Trade Display
- Verbal Presentation - Technique & Content
- Racing

C3.7 Point Allocations

At State and National Finals, points will be awarded to teams across eleven (11) criteria with maximum possible scores as detailed in the following table.

Points Allocation Table		
Criteria	Categories	State & National Finals
1	Specifications	80 points
2	Engineering CAD	70 points
3	Engineering Manufacturing	70 points
4	Engineering Design Process	70 points
5	Project Management	100 points
6	Portfolio Design	60 points
7	Marketing Branding	60 points
8	Marketing Trade Display	145 points
9	Verbal Presentation Technique	70 points
10	Verbal Presentation Content	95 points
11.1	Grand Prix Racing	150 points
11.2	Reaction Time	20 points
11.3	Knockout Racing	30 points
	Total	1020 points

C3.8 Judging Score Cards

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 National Champions - Professional Class

The **Cummins Golden Turbo** STEM Racing National Champions perpetual trophy will be awarded to the Professional Class team with the highest total score - sum of all judging categories (ARTICLE C3.7). In the case of a tied points score, the team with the highest Grand Prix score will be determined the winner. **The Chair of Judge's decision is final.**

C3.10 Critical Regulations Non Compliance

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

- Best Engineered
- Best Engineering CAD
- Best Manufactured Car

ARTICLE C4 - SPECIFICATIONS JUDGING (80 points)

C4.1 General Information

C4.1.1 What will be Assessed?

Specification judging is a detailed inspection process where **BOTH** Car A & B race cars are assessed for compliance with the STEM Racing Australian Technical Regulations. Refer to the specification judging score card for scoring details.

C4.1.2 Team Preparation

Teams **MUST** ensure that their Car A & B are 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 bound, hard copy of their Engineering Compliance Booklet. Refer ARTICLES C2.9. and C2.10.

C4.1.3 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 point's being deducted as detailed in the Technical Regulations. There are two parts to the specification judging process.

C4.1.3.1 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.

C4.1.3.2 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.

C4.1.3.3 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 Cadet 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 (210 points)

C5.1 General Information

C5.1.1 Competition Class Provisions

- **Engineering CAD** and the full range of **Manufacturing** judging is conducted for the Development and Professional competition classes.

C5.1.2 Team Preparation

C5.1.2.1 CAD & Manufacturing Judging

- **Laptop:** A laptop with the CAD & CAM/CNC software used by the team and with all CAD part and assembly data **MUST** to be taken to engineering judging. Other items **MAY** also be taken to help the team explain **ANY** engineering or concepts. The engineering judges will **NOT** have access to the team Trade Display for judging purposes. Preparation **SHOULD** include careful reading of the score card. The key performance indicators describe what the judges will be looking for.
- **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.
- **Testing Document;** This optional document **SHOULD** provide evidence (virtual and physical) for the design decisions taken, including relevant data and analysis. This document will be provided to Engineering Judges.
- **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

- Engineering Portfolio: **Development and Professional Class** teams **SHOULD** thoroughly document their Car Design Process in the Engineering Portfolio.

C5.2 Judging Process / Procedure

C5.2.1 CAD & Manufacturing Judging

C5.2.1.1 Scheduled Interview

CAD & Manufacturing will be primarily judged via scheduled judging interview sessions that will focus on the Key Criteria. These are informal interviews where Judges will ask teams to **demonstrate** their CAD and CAM/CNC work on their laptop and query them on what they have done. This will be supported by secondary evidence contained within a team's Engineering Portfolio.

C5.2.2 Engineering Design Process

Engineering Design Process will be judged from the information documented in the **Engineering Portfolio** of the Development and Professional Class teams. Teams will be awarded points as per the key performance indicators shown on the Engineering Design Process score card/s.

C5.3 Key Criteria

C5.3.1 CAD (70 points)

Refer to the Engineering CAD judging score card for key performance indicator information. Note: CAD judges are **NOT** provided with a copy of a team's Engineering Portfolio.

C5.3.1.1 What will be assessed?

The engineering judges will assess the team's use of CAD technologies, analysis, rendering, technical merit as well as comparing the CAD model with the finished product. Specific areas to be assessed are:

- Application of CAD
- CAD Organisation
- CAD Based Analysis
- Overall Design Technical Merit
- CAD Model vs Finished Product
- Orthographic (A3 bound Engineering Compliance Booklet)
- Rendering (A3 bound Engineering Compliance Booklet)

C5.3.2 Manufacturing (70 points)

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

C5.3.2.1 What will be assessed?

The engineering judges will assess the team's use of CNC and other technologies and the overall technical merit when manufacturing their car body and other components. Specific areas to be assessed are:

- Application of CAM/CNC
- Manufacturing process car body
- Manufacturing process other components
- Tolerancing / Quality Control
- Overall Manufacturing Technical Merit
- Quality of Finished Product - Geometry/Form
- Quality of Finished Product - Surface finish

C5.3.3 Design Process (70 points)

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

C5.3.3.1 What will be assessed?

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

- Requirements Analysis
- Ideas
- Development
- Analysis
- Physical Testing
- Evaluation
- Overall Design Technical Merit

ARTICLE C7 - PORTFOLIO JUDGING (130 points)

C7.1 General Information

C7.1.1 Team Preparation

Each Development and Professional Class team **MUST** submit A3 sized, landscape orientated, well written and presented 'hard copy' Enterprise and Engineering Portfolios. A team's Portfolios tell the story of the team's journey including the knowledge and skills they have acquired along the way. It is considered a professional business document so attention to detail is paramount. Most importantly, teams need to read the Portfolio judging score cards carefully to ensure that all areas to be assessed are included within the context of their Portfolios. In addition to those submitted at event check-in, teams **SHOULD** produce additional copies for exhibiting within the team's Trade Booth and for Verbal Presentation if desired.

C7.1.2 Portfolio Structure

Each Portfolio **MUST** be clearly labelled as either Enterprise or Engineering with the team name. To streamline the judging of team Portfolios, teams **MUST** structure this as **TWO** separate documents each containing the following content:

C7.1.2.1 Enterprise Portfolio

- Project Management
- Marketing
- Skill Development & Linking Skills with Careers

C7.1.2.2 Engineering Portfolio

- Engineering Design Process

Portfolio Design elements will be assessed throughout the teams' **entire** two Portfolios. For more information on the **suggested page content** of the Portfolios, refer to the relevant scorecards and APPENDICES 5 and 6.

C7.1.3 Portfolio Page Count

ALL teams using the 'ENDNOTE' method of referencing **ONLY** will be provided with one extra page in their Engineering and Enterprise Portfolios to facilitate this arrangement. The only content on this extra page is to be the reference list.

C7.1.3.1 State Finals

1. Development Class
 - 7 Pages (including front cover) using Footnote Method
 - 8 Pages (including front cover) using Endnote Method
2. Professional Class
 - 11 Pages (including front cover) using Footnote Method
 - 12 Pages (including front cover) using the Endnote Method

C7.1.3.2 National Final

1. Development and Professional classes
 - 11 Pages (including front cover) using Footnote Method
 - 12 Pages (including front cover) using the Endnote Method

Portfolios can be presented as single or double sided printed sheets. If a Portfolio comprises more than the maximum allowable PRINTED pages, the Judges will only review content up to the prescribed limits.

C7.1.4 Referencing

"Accurate referencing is important in all academic work. As a student you will need to understand the general principles to apply when citing sources and take steps to avoid plagiarism.

Referencing is the process of acknowledging the sources you have used in writing your essay, assignment or piece of work. It allows the reader to access your source documents as quickly and easily as possible in order to verify, if necessary, the validity of your arguments and the evidence on which they are based.

By referring to the works of established authorities and experts in your subject area, you can add weight to your comments and arguments. This helps to demonstrate that you have read widely, and considered and analysed the writings of others

Good referencing is essential to avoid any possible accusation of plagiarism."

C7.1.4.1 Referencing own work

Teams are required to reference any portfolio content they are bringing forward that was submitted by them for previous competitions. If team membership changes, the material brought forward should only be that which the remaining team members produced.

¹ <https://www.macmillanihe.com/studentstudyskills/page/Referencing-and-Avoiding-Plagiarism/>

C71.5 Plagiarism

"Plagiarism is a term that describes the unacknowledged use of someone's work. This includes material or ideas from any (published or unpublished) sources, whether print, web-based (even if freely available) or audiovisual. Using the words or ideas of others without referencing your source would be construed as plagiarism and is a very serious academic offence. At the end of the day, it is regarded as stealing intellectual property."

'Turnitin', an integrated similarity checking and feedback service, will be used to check for authenticity of content in all teams' state and national final portfolios.

Content in team portfolios found to have been plagiarised, will not be assessed as part of the judging process resulting in **zero marks** for the relevant criteria.

C71.6 Judging Process / Procedure

The Portfolios will be assessed behind closed doors which is conducted leading up to or during the course of the finals event. For some key criterion, this will be supported by a verification interview of team members at the Trade Display or other area identified in pre-competition event documentation. Teams **SHOULD** have a copy of their Portfolios on their Trade Display at all times.

C71.7 Submitting to REA Turnitin

Teams are required to submit electronic versions to [the REA Turnitin account](#) prior to a published deadline, as well as several hard copies of their Portfolios at Event Check-in for assessment by judges. Failure to submit the required number and correct Portfolio size will result in penalties being applied.

Notes:

1. PDF documents **MUST** contain text to be submitted. PDF files containing only images of text will be rejected during the upload attempt. To determine if a document contains actual text, copy and paste a section or all of the text into a plain-text editor such as Microsoft Notepad or Apple TextEdit. If no text is copied over, the selection is not actual text.
2. We strongly recommend creating portfolios in **Adobe InDesign** and exporting the final portfolio to PDF. We do **NOT** recommend graphics based software such as Adobe Photoshop, Adobe Illustrator, Canva as these will create problems with Turnitin.
3. Teams **MUST** include the new Turnitin logo within their project as per the conditions for Level 2 Corporate Partner Logos outlined in the Australian Competition Regulations. This logo is available for download from the REA Learning Space.
4. More information on using Turnitin is available via https://learning.rea.org.au/Wiki/Turnitin_Procedure

C71.8 Submitting to School Turnitin Account

[50 Pt Penalty]

FI® in Schools Engineering and Enterprise portfolios are **NOT** to be uploaded to School Turnitin Accounts until AFTER the final versions have been uploaded to the REA Turnitin Account. Teams who do **NOT** comply with this rule will be interpreted as attempting to avoid similarity detection and a 50 pt penalty will be imposed.

C71.9 Portfolio Penalties

The Chair of Judges reserves the right to apply penalties for teams who:

- **DO NOT** submit the correct number of hard copies required for judging
- **DO NOT** provide hard copies in the mandated A3 size
- **DO NOT** provide hard copies in a landscape orientation
- **DO NOT** structure their Portfolio as per C71.3.1 and C71.3.2
- **DO NOT** include a team name on their portfolio covers

[10pt Penalty]

[10pt Penalty per portfolio]

C7.2 Key Criteria

C7.2.1 Project Management & Linking Skills With Careers (100 points)

Refer to the Portfolio score card for detailed point scoring and key performance indicator information. There will be **NO** verification interview required for this key criteria.

C7.2.1.1 What will be assessed?

Project Management **MUST** be contained within each team's Enterprise Portfolio in order to assess the following specific areas.

- [Initiation Process](#)
- [Project Schedule](#)
- [Budget and Resource Management](#)
- [Roles and Responsibilities](#)

- [Team & Stakeholder Communications](#)
- [Risk Management](#)
- [Monitoring & Controlling](#)
- Skill Development for Future Careers

C7.2.2 Portfolio Design (60 points)

Refer to the Portfolio score card for detailed point scoring and key performance indicator information. There will be **NO** verification interview required for this key criterion.

C7.2.2.1 What will be Assessed?

Judges will review each team's **two** Enterprise and Engineering Portfolios in order to assess the following specific areas.

- Production Quality of Materials
- Organisation & [Layout](#)
- Typography
- Photos, Images & [Graphics](#)
- [Readability](#)
- Referencing

ARTICLE C8 - MARKETING JUDGING (205 points)

C8.1 General Information

C8.1.1 Team Preparation

Each team **MUST** prepare an Enterprise Portfolio and a Trade Display. Some **Branding** elements **MUST** be contained within each team's Enterprise Portfolio. Others will be assessed within a team's Trade Booth. Read the **Marketing** Score Cards carefully to ensure that all areas to be assessed are included within the context of their Portfolio and Trade Display.

C8.1.2 Judging Process / Procedure

The Branding and Trade Display criteria from the Marketing Score Card will be assessed primarily within the Trade Display with secondary evidence on logo development assessed from within a team's Enterprise Portfolio. The Judges will introduce themselves then ask questions to help them find certain content and/or seek further explanation. Teams **SHOULD** have a copy of their Enterprise Portfolio on their Trade Display at all times. Teams **MAY** be asked to step away from the Trade Display so judges can gain first impressions and concur before asking them to return to their Display.

C8.2 Key Criteria

C8.2.1 Branding (60 points)

Refer to the Marketing score card for detailed point scoring and key performance indicator information.

C8.2.1.1 What will be assessed?

The Marketing judges will assess a team's **branding** primarily within their **Trade Display**. As a secondary source of evidence, the judges will also access a team's **Portfolio** to assess logo development. Specific areas to be assessed are:

- Team Name
- Logo Development
- Final Logo Design
- Logo Application
- Team Branding
- Media Exposure
- Team Sponsors & REA Corporate Partner ROI
- Team Uniform
- Team Presence
- Team Knowledge

C8.2.2 Trade Display (145 points)

Refer to the Marketing score card for detailed point scoring and key performance indicator information.

C8.2.2.1 Competition Class Restrictions

In addition to the general regulations governing Trade Displays, Development Class teams **MUST** also comply with class restrictions as per C8.5.1 for State Finals.

C8.2.2.2 What will be assessed?

A Trade Display is to visually 'sell' the team's most important key messages in snapshot form for assessment and event promotion. The Marketing judges will assess a team's trade display content and structure.

Specific areas to be assessed are:

- Trade Display Design Development
- Car Display
- Information Design
- Visual Design & Impact
- Structural Design
- Materials Selection & Use
- Sustainability
- Packaging Restrictions

C8.3 Trade Display Design Requirements

Develop a 'Design Brief' that charts your team's creative approach, design considerations (space, purpose), transport limitations (cost and assembly constraints) and environmental impact to comply with the regulations, inform judges and justify your decisions with the following in mind:

C8.3.1 Costs

Determine a budget and stick to it. Seek sponsorship of cash or donations of display elements. Consider ways of reducing costs through reusing and recycling structural elements.

C8.3.2 Research

Research Innovative ideas and current trends online and/or seek a mentor in this space.

C8.3.3 Scorecard Criteria

Read carefully the Trade Display scorecard, Set Up and conditions within this document.

C8.3.4 Design Considerations

The Trade Display serves two primary functions:

1. Externally showcase the team's key messages
2. Internally store a team's assets such as bags, tools and consumables.

With this in mind, use 3D CAD to create a digital mock-up with consideration for:

C8.3.4.1 Dimensions

Recommended maximum internal build dimensions of provided booth **floor area**.

C8.3.4.2 Portability

Think flat-pack, modular, lightweight, pop-up, for ease of set-up and transportation.

C8.3.4.3 Sustainability

Examples include but not limited to reuse and recycle, particularly frameworks that can be reconfigured with new stretch or re-attachable banner materials.

C8.3.4.4 Materials

Consider fabric/textile options which are easier to transport, less prone to damage and more environmentally friendly as opposed to corflute/vinyl equivalents.

C8.3.4.5 Storage

Design options for storage of bags, tools and top-up Marketing materials, as well as hide electrical cables and powerboards.

C8.3.4.6 Lighting

Incorporate lighting to accentuate design features and brighten key areas of your exhibit such as product displays and promotional materials.

Shelving

Use shelves to attractively organise products

C8.3.4.7 Finished Appearance

As booths are no longer framed within a defining shell, teams **SHOULD** consider dressing all external display faces so as to not to detract from neighbouring team displays and the overall competition environment.

C8.3.4.8 Prominence of Team Name

Displays **MUST** include prominently their team name. Penalties apply.

C8.4 Set Up

C8.4.1 Placement and Staging of Team Elements

ALL teams are required to comply with new packaging restrictions for **ALL** trade display team elements brought into State and National Final event venues:

C8.4.1.1 All Team Elements

ALL team elements includes structural components, banners, display items (e.g. show car, portfolio), electrical and electronic items, marketing items including give-aways and consumables, and tools and fasteners required to assemble the trade display but excluding ladders and uniforms.

C8.4.1.2 Placement

Team members are to place team elements in front of their allocated booth floor area as per directions from competition officials. Non team members **MAY** assist with lift and carry only.

C8.4.1.3 Staging

Team members only **MUST** stage team elements within their allocated booth floor area to demonstrate compliance with booth volume when instructed to do so by competition officials.

C8.4.1.4 Items Contained & Sealed

[15pt Penalty]

All staged items **MUST** be brought into the event venue wholly contained within sealed boxes, cartons, containers, cases or tubes. All items **MUST** be packaged as if they were to be couriered interstate or overseas.

C8.4.1.5 Maximum Size of Items

[15pt Penalty]

To align with standard domestic and international, air and road freight maximum dimensions, no one item can be larger than:

- Boxes/Cartons/Containers/Cases: 1200mm x 600mm x 600mm²
- Tubes: 110mm in diameter³

C8.4.1.6 Combined Maximum Volume of Packaged Items

[20pt Penalty]

When staged, **ALL** items **MUST** fit within a maximum volume of 2000mm x 1000mm x 1000mm. Non team members **SHALL NOT** assist or direct with the staging/placement of packaged items within the booth shell.

C8.4.1.7 Forklifts

No forklifts or other material handling equipment will be provided at State and National Finals by REA or the venue.

C8.4.1.8 Shipping Trade Display Items

REA and our venues are no longer in a position to accept shipment of trade display items on behalf of teams. Teams **SHOULD** consider sustainable design and packaging options for transporting display items.

C8.4.2 Assemble

C8.4.2.1 Timing

A time period will be scheduled for teams to assemble their Trade Displays within the provided booth shell scheme arrangement, usually after event check-in and prior to the commencement of judging. Assembly will be conducted by all teams in accordance with the published schedule. A time limit of two (2) hours maximum for each team will be enforced to avoid penalties.

C8.4.2.2 Team Members Only

Non team members are **NOT** permitted to assist teams with the staging or assembly of Trade Displays. All displays **MUST** be designed so that adult assistance is **NOT** required for assembling. This includes power, lighting and height issues. Step or full size ladders will **NOT** be provided, therefore teams need to factor this in to their assembly requirements if they cannot supply their own. All adults (excluding officials and judges) **WILL** be required to remain out of the venue where Trade Displays are located until the setup is complete.

² Tolerance of 50mm applies

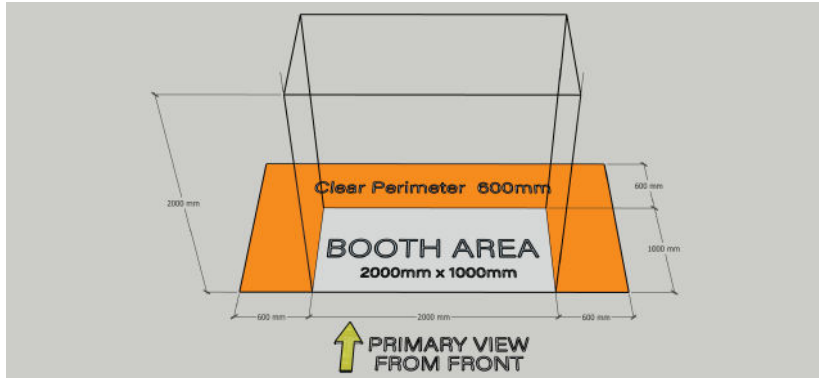
C8.5 State and National Final **Trade Displays**

C8.5.1 Trestle Tables

REA Foundation Ltd. and the venue will **NOT** supply **ANY** teams with trestle tables. Use of a trestle table by teams is **optional and WILL be included in the assessment of ARTICLE C8.4.1.5.**

C8.5.2 Walling & Floor Area Dimensions

Teams will no longer be provided with booth walling at State and National Final events. Instead teams will be allocated a rectangular floor area with dimensions of 2000mm (L) x 1000mm (W) upon which teams can erect their display. The maximum height **SHALL NOT** exceed 2000mm. Penalties apply.



C8.5.3 External Structure Viewing Dimensions

Teams designing a trade display requiring viewing of the outward facing sides and rear of their structures, **MUST** provide a minimum of 900mm of clear viewing space on all sides designed to be viewed. This space can incorporate the 600mm defined perimeter.

C8.5.4 Power

There will be **NO** power provided to the booths. Teams **MAY** use their own supplied battery packs to power their display items or design their trade display to not require any power.

C8.6 General Conditions

Teams **MUST** comply with the following general conditions:

- Each teams' booth **SHOULD** be fully fitted out for judging at the end of the 2hr setup whereupon photos will be taken. **NO** other items can be added to the trade display (excluding top-up marketing items) from this point forward and penalties will be applied for teams breaching this rule.
- **The minimum 600mm booth perimeters MUST be clear at all times. Penalties apply.**
- REA Foundation Ltd. will instruct teams to remove or alter **ANY** display inclusions considered to be a safety hazard or inappropriate, including rubbish, bags etc.
- **NO** part of the team's completed trade display is allowed to protrude beyond the physical dimensions of their allocated space. This includes anything that might protrude above the display space highest point e.g. flags, banner, balloons. Teams **WILL** be required to remove items infringing this rule and penalties will apply.
- Teams **MUST NOT** play sounds or music at their Trade Display at a loud volume. **ANY** sound or music played **MUST** be strictly relevant to the project such as commentary on a video produced by the team and **NOT** just for 'entertainment' value.
- Chairs are **NOT** permitted in or near the displays unless it is a chair/stool specially designed for the display, and this **MUST** sit within the volume of the booth shell's external dimensions.
- **Booths areas** will be pre-allocated to teams by the event organisers. Teams **MUST** use the area allocated.
- Trade Displays **MUST** be manned by at least one team member at all times excluding judging sessions. When a team is undertaking a judging session, the teacher or a supporting adult **SHOULD** supervise the trade display to ensure security. Note that competitions are generally open to the public.
- Workplace health and safety measures **and structural integrity MUST be considered when teams design and assemble their displays.**
- **ANY** electrical appliance (including power boards and extension cords) connected to a power supply **MUST** have a valid electrical safety test tag.
- No team member, teacher or their guests are permitted to take photographs of a team's portfolios without the consent of the team who authored these documents.
- No marketing or other items are to be removed from a trade display without the consent of the team who owns the items.

C8.6.1 Trade Display Penalties

The Chair of Judges reserves the right to apply penalties for teams who:

- **DO NOT** complete their set-up within the 2hr time limit.
- **DO NOT** leave their stand in a safe state.
- **DO NOT** clear their display, perimeter & surrounding area of all rubbish.
- **DO NOT** contain their display within the display volume.
- **DO NOT** comply with added content restrictions.
- **DO NOT** include their team name prominently within their display.
- **DO NOT** comply with the max 2000mm display height (50mm tolerance).

[10pt Penalty]

[50pt Penalty]

ARTICLE C9 - VERBAL PRESENTATION JUDGING (165 points)

C9.1 General Information

C9.1.1 Who needs to attend?

All team members **MUST** be present at and contribute to the Verbal Presentation.

C9.1.2 Judging Process / Procedure

Verbal presentation judging is scheduled for the same duration as other judging sessions, usually 20 – 30 minutes. Teams will be given 5 minutes 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 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 team's presentation time, the judges **MAY** choose to provide some feedback and / or ask **ANY** clarifying questions they feel necessary. However, assessment can **ONLY** be based on the team's 10-minute presentation. Verbal presentations **MAY** be filmed for judge's review or promotional and future resource purposes.

C9.1.3 Team Preparation

Each team is required to prepare a verbal presentation as per the requirements at ARTICLE C2.13.6. **ANY** multimedia content, slides etc. **MUST** be saved on and shown using the team's own laptop along with VGA and HDMI cables. Teams need to have all presentation resources tested and ready for verbal presentation judging. Most importantly, teams **SHOULD** read the verbal presentation judging score card carefully to ensure their presentation features all elements and content that the verbal presentation judges will be looking for.

C9.1.4 Verbal Presentation Judging Provisions.

REA Foundation Ltd. 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 large TV monitor. Multimedia sound systems **MAY NOT** always be available and teams **MAY** have to bring their own portable speakers. If available 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.

C9.1.5 Verbal Presentation Video Recordings

The verbal presentations of all teams **MAY** be video recorded by the REA Foundation Ltd. for the purpose of judging review and / or post event publicity and promotional purposes for F1® in Schools.

C9.2 Key Criteria

C9.2.1 Technique (70 points)

Refer to the Verbal Presentation score card for detailed point scoring and key performance indicator information.

C9.2.1.1 What will be assessed?

- Presentation Energy
- Team Contribution
- Visual Aids
- Audience Engagement
- Articulation
- Structure
- Use of Time

C9.2.2 Content (95 points)

Refer to the Verbal Presentation score card for detailed point scoring and key performance indicator information.

C9.2.2.1 What will be assessed?

- Team Objectives
- Description of Car Product
- Innovation
- Refinement
- Mentoring Collaborations
- Learning Outcomes
- Future Career Aspirations and Research
- Overall Clarity

ARTICLE C10 - RACING (200 points)

C10.1 General Information

C10.1.1 Launch / Timing System

At State and National 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.

C10.1.2 Official REA Foundation Ltd Race Track

At State and National 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.

C10.1.3 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.

C10.1.4 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 marshal is ready to launch the cars. No further time delays will be allowed.

C10.1.5 Who needs to attend?

All Development and Professional Class team members **MUST** 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. Cadet Class teams who cannot attend State Finals will have their car raced in Automatic Launch mode by the track marshalls and the results recorded.

C10.1.6 Time Penalties

If a team's Car A or B 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.

C10.1.7 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.

C10.1.8 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.

C10.1.9 Did Not Start (DNS)

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

C10.1.10 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.

C10.1.11 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.

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 an FS, and the other team's time is recorded.

If both teams false start the first race, the race will be forfeited. If both teams subsequently false start the second race, the race will be re-run until a winner is determined.

If both teams false start the second race **ONLY**, the race will be forfeited and the winner determined from the first race results.

C10.1.12 CO2 Cylinders

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

All cylinders for State and National 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
- National Finals: Within 0.30 grams, with random allocation

C10.1.13 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.

C10.1.14 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.

C10.2 Types of Racing

The STEM Racing State and National Final racing points will be awarded through the staging of two types of racing.

C10.2.1 Grand Prix (Reaction) Racing

Manual / driver launch mode, commonly referred to as 'reaction racing' consisting of **four** races in each lane as per the judging schedule. These **eight** races make up the overall Grand Prix Race event results.

'Drivers' will **NOT** be permitted to practise during the official race time.

C10.2.2 Knock-out (Reaction) Racing

Manual / driver launch mode, one race in each lane per round of competition.

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 marshal 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 Manual Launch Race Procedure

Cars are launched in manual / driver reaction mode with **eight (8)** races total per team, **four (4)** 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 Both Car A and Car B **WILL** be used for Reaction Racing.
- iv All cars are weighed and ballast applied.
- v Race 1 – Race Marshalls will load both Car A & B onto the track **in the same lane** along with a competitor's cars in the opposite lane in accordance with the judging schedule.
- vi Race Marshalls set Car A at track start line, inserts CO2 cylinder and engages car with launch pod.
- vii A team member is then allowed 30 seconds to 'fine tune' the staging of their first car.
- viii Driver stands trackside with corresponding lane start trigger. Remaining team members stand behind driver.
- ix Race Marshall presses the start system reset button – lights come on
- x When lights extinguish, driver presses trigger and car is launched.
- xi Judge records TOTAL RACE TIME and REACTION TIME displayed on start gate.
- xii **CO2 cylinder is to remain in the chamber until the car is returned to the start line.**
- xiii Team member at finish line lifts the retardation device and rolls car to the end of the tether line and adjusts the retardation device for the second race
- xiv Race 2 conducted **in the same** lane using same process as per vii – xi **using Car B.**
- xv **Team member** at finish line removes retardation device and rolls cars to the start line.
- xvi Race Marshall removes cars from track and returns them to Parc Ferme, or places them at the designated Car Repair location if damage has occurred. At the conclusion of Car Repair, cars are returned to Parc Ferme.
- xvii **Driver can be inter-changed between each racing session if desired.**
- xviii 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
- xix **Races 5 - 8 follow the same procedure at a later scheduled time.**

C10.3.5 Knock-out Competition Procedure

Teams will be issued the race seeding prior to knock-out racing commencing. The seeding order for the first knock-out round is determined through seeding all teams using the fastest 'gross race time' they achieved from racing for the Grand Prix Race event including **ANY** relevant Time Penalties. In the event that two or more teams achieve the same Best Gross Lap, rankings will be based on a team's second fastest Gross Lap. Some teams **MAY** draw a 'bye' in round 1. 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. The knock-out competition will be conducted as follows:

Teams race in order of the competition seeded draw.

- i One team member to track finish for deceleration system control – maximum of 30 seconds.
- ii Both Car A and Car B **WILL** be used for Knockout Racing.
- iii All cars are weighed and ballast applied.
- iv Teams will decide which lanes Car A & B will race on.
- v Race 1 – Race Marshalls will load both Car A & B onto the track at the same time, in opposite lanes along with a competitor's cars in accordance with the team's requirements.
- vi Race Marshalls set cars at track start line, inserts CO2 cylinder and engages car with launch pod.
- vii A team member is then allowed 30 seconds to 'fine tune' the staging of their first car.
- viii Driver stands trackside with corresponding lane start trigger. Remaining team members stand behind driver.
- ix Race Marshall presses the start system reset button – lights come on
- x When lights extinguish, driver presses trigger and car is launched.
- xi Judge records TOTAL RACE TIME displayed on start gate.
- xii **CO2 cylinder is to remain in the chamber until the car is returned to the start line.**
- xiii Team member at finish line lifts the retardation device and rolls car to the end of the tether line, then swaps lanes and adjusts the retardation device for the second race. All care **MUST** be taken to ensure no damage is occasioned to the

- competitor's car sitting at the end of the tether line.
- xiv Race 2, driver can be inter-changed at this point.
- xv Race 2 conducted in opposing lane using same process as per vi – xi.
- xvi **Team members** at finish line remove retardation device and roll cars to the start line.
- xvii Race Marshall removes cars from track and returns them to Parc Ferme, or places them at the designated Car Repair location if damage has occurred. At the conclusion of Car Repair, cars are returned to Parc Ferme
- xviii In case of a tied result, a further 'sudden death' race will be conducted and teams will toss a coin for lane allocation.

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 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:

C10.4.1.1 Professional & Development Classes (150 points)

- **Regional Final Race Points** = $50 + (100 / (\text{Fastest Car Race Time} \times 0.30)) \times (\text{Fastest Car Race Time} \times 1.30 - \text{Team's Race Time})$
- **State Final Race Points** = $50 + (100 / (\text{Fastest Car Race Time} \times 0.20)) \times (\text{Fastest Car Race Time} \times 1.20 - \text{Team's Race Time})$
- **National Final Race Points** = $50 + (100 / (\text{Fastest Car Race Time} \times 0.15)) \times (\text{Fastest Car Race Time} \times 1.15 - \text{Team's Race Time})$

The **minimum score** awarded for a team completing the race is 50 marks and requires **7 legal runs**.

The **minimum score** awarded for a team starting but failing to complete the race is 30 marks plus 2 marks for each lap completed up to a maximum of 6 laps.

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

C10.4.1.2 Cadet 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.

C10.4.2 Fastest Reaction Time (20 points)

At State and National Finals, Development and Professional Class teams **ONLY** will be awarded points based on their fastest driver Reaction Time as per the following table:

Fastest Reaction Time	Points/Marks Awarded
< 0.141	20 points
$0.140 \leq \text{time} < 0.150$	17 points
$0.151 \leq \text{time} < 0.160$	15 points
$0.161 \leq \text{time} < 0.170$	13 points
$0.171 \leq \text{time} < 0.180$	11 points
$0.181 \leq \text{time} < 0.190$	9 points
$0.190 \leq \text{time} < 0.200$	7 points
>0.200	5 points

C10.4.3 Knockout Racing (30 points)

State and National Final events **WILL** include knock-out Manual Launch (Reaction) Racing for Professional and Development Class teams where time permits. The knockout draw is seeded based on team rankings from the Manual Launch (Reaction) Racing of the Grand Prix racing event (qualifying).

C10.4.3.1 State Final Arrangements

- Where time permits, all teams will participate in Knockout Racing. This decision will be at the discretion of the Chair of Judges.
- If either the Junior or Senior Professional Classes have 5 or less competing teams, both will be combined into an overall Professional Class for the purpose of Knockout Racing
- Where time does **NOT** permit, **ONLY** the top 8 seeded teams in each of the Development and overall Professional Classes will participate in the knock-out competition.

C10.4.3.2 National Final Arrangements

- **ONLY** the top 8 seeded teams in each of the Development and overall Professional Classes will participate in the knock-out competition.

An example draw for a field of 8 and 16 teams is shown on the following page.

C10.4.3.3 Sample Knockout Draws

Field of 16 – State Finals

Round of 16	Quarter Final	Semi Final	Final	Winner
Rank 1	"	"	"	"
16				
8	"			
12				
4	"			
13				
9	"			
5				
6	"	"		
10				
14				
3				
7	"		"	
11				
15	"			
2				

Field of 8 – State or National Final

Round of 8	Semi Final	Final	Winner
Rank 1			
8			
5			
4			
6			
3			
7			
2			

C10.4.3.4 Marks Awarded for Final Positions

The marks to be awarded from actual Knock-out racing outcomes or direct rankings from the reaction launch racing are shown in the following table.

Final Position in Knock-out Racing

Winner – Knock-out Champion (1st)
Knocked out in Final (2nd)
Knocked out in Semi-Final (3rd or 4th)
Knocked-out in Quarter Final (5th to 8th place)
Knocked out in a preliminary round (9th to last place)
Teams excluded from Knock-out racing

Marks Awarded

30 marks
27 marks
24 marks
18 marks
12 marks
0 marks

C10.4.3.5 Knock-out Racing Not Conducted

Where knock-out races are **NOT** specifically conducted due to time constraints or unforeseen circumstances, then the knock-out marks will be awarded based directly upon the manual reaction launch run time rankings.

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 and National 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 Engineering 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 & B with respect to the Australian Technical Regulations.

C13.3.2 Engineering Judges

Will assess each team's use of CAD/CAM, CNC technologies, quality of manufacture and the engineering design process.

C13.3.3 Portfolio Judges

Portfolio Judges will assess each team's portfolio design and project management as per the Portfolio score card.

C13.3.4 Marketing Judges

Marketing Judges will assess each team's branding and trade display as per the Marketing score card.

C13.3.5 Verbal Presentation Judges

Verbal presentation Judges will assess each team's presentation technique and content as per the verbal presentation 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 and National 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 and National Finals, all students and judges will receive official participation/recognition certificates. These will be provided in the team and judge information packs.

Students participating at a National Final will also receive participation medallions presented at the Awards Presentation ceremony.

C14.3 Prizes and Trophies

C14.3.1 State Finals

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

C14.3.2 National Finals

At National Finals, winning teams will be presented with a certificate.

C14.3.3 Perpetual Trophies

Perpetual Trophies are presented for some but **NOT** all awards at National Finals **ONLY**. Teams receiving these trophies are responsible for having their team details engraved upon the trophy using identical material/engraving plates to maintain consistency of appearance. The teacher/school is responsible for returning the trophy to REA Foundation Ltd. prior to the following National Final.

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.

C14.4.1 Development and Professional Class Teams

GRAND PRIX RACE AWARD

The team with fastest race time and scoring 150pts in:

Criteria 11.1: Racing/Grand Prix Racing.

FASTEST LAP AWARD

The team with fastest individual net run time from:

Criteria 11.1: Racing/Grand Prix Racing.

BEST REACTION TIME AWARD³

The team with the quickest reaction launch time from:

Criteria 11.2: Racing/Grand Prix Racing

KNOCKOUT CHAMPIONS AWARD⁴

The team with the fastest gross time in the last round of:

Criteria 11.3: Racing/Knockout Racing

BEST ENGINEERED AWARD⁴

Team with highest combined score for:

Criteria 1: Engineering/Specifications

Criteria 2: Engineering/Computer Aided Design (CAD)

Criteria 3: Engineering/Manufacturing

Criteria 4: Engineering/ Design Process

BEST ENGINEERING CAD AWARD^{4,5}

Team with highest score for:

Criteria 2: Engineering/Computer Aided Design (CAD)

BEST MANUFACTURED CAR AWARD^{4,5}

Team with highest score for:

Criteria 3: Engineering/Manufacturing

³ No Perpetual Trophy exists for these awards at a National Final

⁴ Not awarded to teams with time penalties

BEST TEAM PORTFOLIO AWARD

Team with highest combined score for:

Criteria 4: Engineering Design Process

Criteria 5: Portfolio/Project Management

Criteria 6: Portfolio/Portfolio Design

Criteria 7.1, 7.2 & 7.3: Marketing/Branding

BEST MANAGED ENTERPRISE AWARD

Team with highest score for:

Criteria 5: Portfolio/Project Management

BEST GRAPHIC DESIGN AWARD

Team with highest combined score for:

Criteria 6: Portfolio/Portfolio Design

Criteria 7: Marketing/Branding

Criteria 8.1, 8.2, 8.3 & 8.4: Marketing/Trade Display

BEST TEAM TRADE DISPLAY AWARD

Criteria 8: Marketing/Trade Display

BEST TEAM MARKETING AWARD

Team with highest combined score for:

Criteria 7: Marketing/Branding

Criteria 8: Marketing/Trade Display

Criteria 5.5: Portfolio/Project Management

BEST TEAM VERBAL PRESENTATION AWARD

Team with highest combined score for:

Criteria 9: Verbal Presentation/Presentation Technique

Criteria 10: Verbal Presentation/Content

OUTSTANDING INDUSTRY COLLABORATION AWARD

Team with highest score for:

Criteria 10.5: Verbal Presentation/Content

INNOVATION AWARD

Team with highest score for:

Criteria 10.3 & 10.4: Verbal Presentation/Content

CHAIR OF JUDGES RECOGNITION OF ACHIEVEMENT AWARD⁵ (National Final Only)

Discretion of the Chair of Judges

BEST NEWCOMER AWARD⁶

Highest scoring team from school attending the National Final for the first time

3RD PLACE⁵

Team with the third highest scoring sum of all marking criteria

2ND PLACE⁵

Team with the second highest scoring sum of all marking criteria

CHAMPIONS

Team with the highest scoring sum of all marking criteria

⁵ No Perpetual Trophy exists for these awards at a National Final

1. AWARDS MATRIX

			Professional & Development Class Awards																			
Judging Category	Judging Category	Criteria	Champions	2nd Place	3rd Place	Best Newcomer	Best Engineered	Best Engineering CAD	Best Manufactured Car	Fastest Lap	Grand Prix Race	Best Reaction Time	Knockout Champions	Best Managed Enterprise	Best Team Portfolio	Best Graphic Design	Best Team Trade Display	Best Team Marketing	Best Team Verbal Pres.	Outstanding Ind. Collab.	Innovation	
Engineering	Specifications	1 Specifications																				
Engineering	Computer Aided Design	2.1 Application of CAD																				
		2.2 CAD Organisation																				
		2.3 CAD Based Analysis																				
		2.4 Overall CAD Technical Merit																				
		2.5 CAD Model v/s Finished Product																				
		2.6 Orthographic																				
		2.7 Rendering																				
Engineering	Manufacturing	3.1 Application of CAD/CAM																				
		3.2 Manufacturing Process Car Body																				
		3.3 Manufacturing Process Other Components																				
		3.4 Tolerancing/Quality Control																				
		3.5 Manufacturing Technical Merit																				
		3.6 Quality of Finished Product - Geometry/Form																				
		3.7 Quality of Finished Product - Surface Finish																				
Engineering	Design Process	4.1 Requirements Analysis																				
		4.2 Ideas																				
		4.3 Development																				
		4.4 Analysis																				
		4.5 Physical Testing																				
		4.6 Evaluation																				
		4.7 Overall Design Technical Merit																				
Portfolio	Team & Project Management	5.1 Initiation Process																				
		5.2 Project Schedule																				
		5.3 Budget Resource																				
		5.4 Roles and Responsibilities																				
		5.5 Team and Stakeholder Communications																				
		5.6 Risk Management																				
		5.7 Monitoring and Controlling																				
		5.8 Skill Development for Future Careers																				
Portfolio	Portfolio Design	6.1 Production Quality of Materials																				
		6.2 Organisation & Layout																				
		6.3 Typography																				
		6.4 Photos, Images and Graphics																				
		6.5 Readability																				
		6.6 Referencing																				
Marketing	Branding	7.1 Team Name																				
		7.2 Logo Development																				
		7.3 Final Logo Design																				
		7.4 Logo Application																				
		7.5 Team Branding																				
		7.6 Media Exposure																				
		7.7 Sponsorship ROI / REA CP Logos																				
		7.8 Team Uniform																				
		7.9 Team Presence																				
		7.10 Team Knowledge																				
Marketing	Trade Display	8.1 Trade Display Design Development																				
		8.2 Car Design																				
		8.3 Information Design																				
		8.4 Use of ICT's																				
		8.5 Visual Design & Impact																				
		8.6 Structural Design																				
		8.7 Structural Materials Design																				
		8.8 Sustainability																				
		8.9 Packaging Restrictions																				
Verbal Presentation	Technique	9.1 Presentation Energy																				
		9.2 Team Contribution																				
		9.3 Visual Aids																				
		9.4 Audience Engagement																				
		9.5 Articulation																				
		9.6 Structure																				
		9.7 Timing																				
Verbal Presentation	Content	10.1 Team Objectives																				
		10.2 Description of Car Product																				
		10.3 Innovation																				
		10.4 Refinement																				
		10.5 Collaboration																				
		10.6 Learning Outcomes																				
		10.7 Future Career Aspirations & Research																				
		10.8 Overall Clarity																				
		11.1 Manual Launch																				
		11.2 Reaction Time																				
		11.3 Knockout Race																				

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

3. DEVELOPMENT CLASS PORTFOLIO CONTENT PAGE PLAN

Development Portfolio Page Content Plan: Suggested content organisation for assessment

Enterprise Portfolio:

Project Management & Career Development

Cover.*
Name & Logo

Initiation Process, Project
Schedule & Budget &
Resources

Team & Stakeholder
Comms, Roles and
Responsibilities
*

Risk Mgmt, Monit. &
Controlling, Linking
Skills/Future Careers
*

Marketing & Partnerships

Stakeholder ROI Plan &
Community Activity / PR
**

Team Name, Logo,
Branding, Uniform &
Trade Booth

Partnerships with
External Individuals &
Collaborations
*

Engineering Portfolio:

Engineering Design Process

Cover.*
Rendering
Name & Logo

Car Design
Requirements &
Research

Car Design
Development & Analysis

Car Design
Development & Analysis

Car Design Physical
Testing. Evaluation

Free for teams to decide
content

To streamline the judging process, teams are encouraged to arrange the content of their Enterprise and Engineering Portfolios in accordance with this Content Plan. However they should also refer to the relevant scored criteria. The number of pages allocated to the suggested criteria above is at the discretion of each team.

* Components of the Cover are critical to both the Enterprise & Engineering Portfolios

Pink – Portfolio content assessed in Portfolio criteria

Blue – Portfolio content assessed in Booth criteria

Red – Portfolio content assessed in Engineering criteria

Green – Assessed in Marketing criteria

4. PROFESSIONAL CLASS PORTFOLIO CONTENT PAGE PLAN

Professional Portfolio Page Content Plan: Suggested content organisation for assessment

Enterprise Portfolio:

Project Management & Career Development

Cover:.* Name & Logo ***	Initiation Process, Project Schedule ***	Budget & Resources Management, *	Team & Stakeholder Comms, Roles and Responsibilities *	Risk Management, Monitoring & Controlling *	Linking Skills with Future Careers *
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Marketing & Partnerships

Team Stakeholder ROI Plan & Activity **	Team Community Activity/ PR & Social Media *	Team Name, Logo & Branding ***	Uniform & Booth Design *	Partnerships with External Individuals & Collaborations *
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Engineering Portfolio:

Engineering Design Process

Cover:.* Rendering Name & Logo ***	Car Design Requirements & Research ***	Car Design Ideas ***	Innovation *	Car Design Development ***	Car Design Analysis ***
Car Manufacturing ***	Car Manufacturing ***	Car Design Physical Testing ***	Car Process Evaluation ***	Free for teams to decide content	

To streamline the judging process, teams are encouraged to arrange the content of their Enterprise and Engineering Portfolios in accordance with this Content Plan. However they should also refer to the relevant scorecard criteria. The number of pages allocated to the suggested criteria above is at the discretion of each team.

* Components of the Cover are critical to both the Enterprise & Engineering Portfolios

Pink – Portfolio content assessed in Portfolio criteria
Blue – Portfolio content assessed in Booth criteria
Red – Portfolio content assessed in Engineering criteria
Green – Assessed in Marketing criteria



CRITERIA 1 - SPECIFICATION SCORE CARD (1 OF 4)

For clarification on individual regulations, refer to the 2024 Australian Technical Regulations.

Regulation	Regulation Overview	Quick Guide	Penalty	Car A	Car B	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							
T3.1.3	Car A & B - Identical Components	Visual Check	-10							
T3.1.4	Machining (Mirrored Side & Top OR Top & Bottom) with 6mm cutter	Visual Check	-10						DC Only	
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							
T3.3.2	Signed & uploaded Car Declaration form as per C2.4.14	Check with Admin	-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 Logo Decals (REA, FIS, DoD)	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 FIS 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							
T3.8	Track clearance	Min: 2mm	-4							
T3.9.1	Balsa default material for all non-rotating components	Visual & Drawing Check	-4							
T3.9.2	Balsa Thickness	Min 3mm	-1							
T3.10	Status during racing - no parts removed/added for racing	Visual check	-2							
ARTICLE T4 - HALO REGULATIONS										
T4.2	Inclusion of Halo without dimensional changes	Visual & Drawing Check	-4							Pass/Fail
T4.3	Visibility front and side views - no obstructions	Visual Check	-4							Pass/Fail
LEGEND										
	Eligibility Regulations/Possible Disqualification	Critical Regulations - 0.02/0.05 Time Penalty	Critical Regulations - 0.05 Time Penalty							
	DC = Development Class PC = Professional Class									

CRITERIA 1 - SPECIFICATION SCORE CARD (2 OF 4)

For clarification on individual regulations, refer to the 2024 Australian Technical Regulations.

Regulation	Regulation Overview	Min/Max Quick Guide	Penalty	Car A	Car B	Judge 1	Judge 2	Deduction	Remarks	Rectification
ARTICLE T4 - HALO RULES cont.										
T4.4	Visibility top view - no obstructions excluding the helmet	Min 40mm	-4							Pass/Fail
T4.5	Circular notch height above track surface	36mm (±1.0mm)	-4							
T4.6	Frontal halo load test	1kg mass	-4							
T4.7	Inverted halo load test	400g mass	-4							
T4.8	Inclusion of Helmet without dimensional changes	Visual Check	-4							
ARTICLE T5 - BODY & SIDEPOD REGULATIONS										
T5.1	Body construction - single continuous balsa 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							
ARTICLE T6 - NOSECONE REGULATIONS										
T6.1	Nosecone/parts metallic material prohibited	Visual & Drawing Check	-4							Pass/Fail
T6.2	Nose cone non-metallic material not behind front axle centre line	Visual & Drawing Check	-1							
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							
T7.3.1	Front wing clear airspace	Min 3mm	-4							
T7.3.2	Rear wing clear airspace	Min 3mm	-4							
T7.4	Front wing/support structure in front of centre line of axle	Visual Check	-1							
T7.5	Wing construction must remain rigid during racing	Visual Check	-2							
T7.6	Front wing/support structure-no-metallic material	Visual & Drawing Check	-10							
T7.7	Front wing/support structure-connect with nosecone only	Visual & Drawing Check	-1							
T7.8.1	Front wing span	Balsa: Min 34mm Other: Min 40mm	-4							

LEGEND ■ Eligibility Regulations/Possible Disqualification ■ Critical Regulations - 0.02s/0.05s Time Penalty ■ Critical Regulations - 0.05s Time Penalty
■ Critical Regulations - 0.1s Time Penalty ■ CC = Cadet Class ■ DC = Development Class PC = Professional Class

CRITERIA 1 - SPECIFICATION SCORE CARD (3 OF 4)

For clarification on individual regulations, refer to the 2024 Australian Technical Regulations.

Regulation	Regulation Overview	Min/Max Quick Guide	Penalty	Car A	Car B	Judge 1	Judge 2	Deduction	Remarks	Rectification
ARTICLE T7 – WING REGULATIONS cont.										
T7.8.2	Rear wing span	Balsa: Min 34mm Other: Min 40mm	-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	Balsa: Min 3.5mm Max: 9mm Other: Min 1.5mm Max 9mm	-2							Pass/Fail
T7.11.2	Rear wing thickness	Balsa: Min 3.5mm Max: 9mm Other: Min 1.5mm Max 9mm	-2							Pass/Fail
T7.12	Rear wing positioning behind centre line of rear axle	Visual Check	-1							Pass/Fail
T7.13	Rear wing height measured normal to bottom surface	> 34mm	-4							Pass/Fail
T7.14	Rear wing must be made of balsa	Visual & Drawing Check	-4						DC Only	Pass/Fail
T7.15	Rear wing non-metallic support structure behind rear axle centre line	Check Drawings	-4						PC Only	Pass/Fail
ARTICLE T8 – WHEEL REGULATIONS										
T8.1	Number and location, common shared centreline	4, 2 x 2	-4							Pass/Fail
T8.2.1	Combination of four unmodified REA standard wheels	Visual Check	-4						DC Only	Pass/Fail
T8.3	Team manufactured wheels – front & rear wheel diameter	Min 26mm	-4						PC Only	Pass/Fail
T8.4	Track contact width – front & rear wheels	Front: Min 12mm Rear: Min 15mm	-4						PC Only	Pass/Fail
T8.5	Full contact width with race track – no camber	80gsm paper	-2							Pass/Fail
T8.6	No tyre tread – consistent diameter & circumference	Visual Check	-2							Pass/Fail
T8.7	Freely rotating wheels – forward rolling motion	Reasonably minimal effort	-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
LEGEND										
	 Eligibility Regulations/Possible Disqualification	 Critical Regulations - 0.02s/0.05s Time Penalty	 Critical Regulations - 0.05s Time Penalty							
DC = Development Class		PC = Professional Class								

CRITERIA 1 - SPECIFICATION SCORE CARD (4 OF 4)

For clarification on individual regulations, refer to the 2024 Australian Technical Regulations.

Regulation	Regulation Overview	Min/Max Quick Guide	Penalty	Car A	Car B	Judge 1	Judge 2	Deduction	Remarks	Rectification
ARTICLE T8 - WHEEL REGULATIONS cont.										
T8.9.4	Visibility behind rear wheels	Min 1mm exclusion zone	-4							Pass/Fail
ARTICLE T9 - WHEEL SUPPORT RULES										
T9.1	Contained with projected cylinder volume	Visual Check	-2							Pass/Fail
T9.2	Not integrated with wing support systems	Visual Check	-2							
T9.3	Four unmodified REA axle grommets	Visual Check	-4						DC Only	
T9.4.1	2 standard REA axles or modified axles of same diameter	Visual Check/Min 3mm	-2						DC Only	
T9.5.1	No added parts or modifications to wheel systems	Visual Check	-2						DC Only	
T9.6	No integration with Wing Support Systems	Visual & Drawing Check	-2							
ARTICLE T10 - TETHER LINE GUIDE RULES										
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							
T10.6	Separate tether guide support system (T10.6.1 - T10.6.6)	Visual Check	-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	20mm	-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							
T11.7	CO2 cylinder inserted & withdrawn – no removal of car parts	Visual Check	-4							

LEGEND Eligibility Regulations/Possible Disqualification Critical Regulations - 0.02s/0.05s Time Penalty Critical Regulations - 0.1s Time Penalty

DC = Development Class **PC = Professional Class**

CRITERIA 2 - ENGINEERING: COMPUTER AIDED DESIGN SCORE CARD

JUDGING SUB CATEGORY	COMPUTER AIDED DESIGN	TEAM ID
PRIMARY EVIDENCE	TEAM INTERVIEW	TEAM NAME
SECONDARY EVIDENCE	MODELLING ON TEAM COMPUTER, ENGINEERING COMPLIANCE BOOKLET & OPTIONAL TESTING DOCUMENT	SCHOOL
CRITERIA	2	COMPETITION CLASS

	Low	DEVELOPING	ADVANCED	SCORE
CRITERIA	0 1 2	3 4 5 6	7 8 9 10	/10
2.1 Application of CAD	Basic understanding and application of CAD	Good understanding and application of CAD	Advanced understanding and application of CAD throughout.	/10
2.2 CAD Organisation	Generally disorganised	Satisfactory organisation of data and models	Data & parts highly ordered & linked. Fully constrained CAD product assembly	/10
2.3 CAD Based Analysis	Minimal analysis shown	Good analysis. Results applied to development	Variety of advanced and relevant analysis techniques conducted	/10
2.4 Overall CAD Technical Merit	Basic CAD design with little technical merit	Developed CAD design with some technical merit	Original & clever developed CAD design with excellent technical merit	/10
2.5 CAD Model v's Finished Product¹	Basic Similarity	Good Similarity	Excellent Similarity	/10
2.6 Orthographic (Engineering Compliance Booklet)	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
2.7 Rendering	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)				/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				- /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 .				/70
Computer Aided Design GRAND TOTAL				/70
Minus Penalties				- /2
Computer Aided Design GRAND TOTAL				/70

NOTE: Team Engineering Portfolios are **NOT** provided to CAD judges.

¹ This criteria marked using a team's Display (3rd) Car, if produced by the team, otherwise zero points apply.

CRITERIA 3 - ENGINEERING: MANUFACTURING SCORE CARD

JUDGING SUB CATEGORY	MANUFACTURING	TEAM ID
PRIMARY EVIDENCE	TEAM INTERVIEW	TEAM NAME
SECONDARY EVIDENCE	ENGINEERING PORTFOLIO, OPTIONAL TESTING DOCUMENT & DISPLAY CAR	SCHOOL
CRITERIA	3	COMPETITION CLASS

	Low	DEVELOPING	ADVANCED	SCORE
CRITERIA	01 012	23 3456	45 78910	/5 /10
3.1 Application of CAM / CNC	Minimal evidence of CNC understanding	Effective use and understanding of CNC machining processes used	High level of CNC machining competence. Appropriately complex techniques and processes used to achieve manufacturing goal	/10
3.2 Manufacturing Process: Car Body	Little manufacturing details	Manufacturing processes and some issues presented	Detailed assessment of all manufacturing, stages, materials & issues	/10
3.3 Manufacturing Process: Other Components	Little manufacturing details	Manufacturing processes and some issues presented	Detailed assessment of all manufacturing, stages, materials & issues	/10
3.4 Tolerancing / Quality Control	Little consideration of tolerancing and quality control	Good consideration of tolerancing and quality control	Excellent consideration of tolerancing and quality control	/10
3.5 Overall Manufacturing Technical Merit	Basic manufacturing with little technical merit	Good manufacturing with technical merit	Original & clever manufacturing processes with excellent technical merit	/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. Two cars are identical.	/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. Two cars are identical.	/10
			Manufacturing GRAND TOTAL	/70

¹ 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	SCORE
PRIMARY EVIDENCE	TEAM ENGINEERING PORTFOLIO	TEAM NAME	
SECONDARY EVIDENCE	TESTING DOCUMENT	SCHOOL	
CRITERIA	4	COMPETITION CLASS	
	Low	ADVANCED	
CRITERIA	0 1 2	7 8 9 10	/10
4.1 Requirements Analysis	Limited development of objectives	Excellent statement of objectives supported by research	/10
4.2 Ideas	Single or basic concepts	Several technically inspired ideas for different car features/functions	/10
4.3 Development	Limited development shown	Clearly justified developments based around research and testing	/10
4.4 Analysis	Little evidence of analysis	Quality analysis methodologies. Accurate results and data linked to design revisions. Advanced use of CFD and other design tools.	/10
4.5 Physical Testing	Little evidence of testing	Quality experimental methodologies. Accurate results linked to design revisions.	/10
4.6 Evaluation	No or limited evaluation	Excellent ongoing evaluations linked to improvement actions	/10
4.7 Overall Design Technical Merit	Basic design process with little technical merit	Original & clever developed design process with excellent technical merit	/10
		Design Process GRAND TOTAL	/70



CRITERIA 5 - PORTFOLIO: PROJECT MANAGEMENT & CAREER DEVELOPMENT SCORE CARD

JUDGING SUB CATEGORY	PROJECT MANAGEMENT & CAREER DEVELOPMENT	TEAM ID
PRIMARY EVIDENCE	TEAM ENTERPRISE PORTFOLIO:	TEAM NAME
SECONDARY EVIDENCE		SCHOOL
CRITERIA	5	COMPETITION CLASS

	LOW	DEVELOPING	ADVANCED	SCORE
CRITERIA	0 1 2 0 1 2 3 4	3 4 5 6 5 6 7 8 9 10	7 8 9 10 11 12 13 14 15	/10 /15
5.1 <u>Initiation Process</u>	Limited evidence of an <u>Initiation process</u> .	Evidence of an <u>Initiation process</u> with goals and <u>deliverables</u> identified, leading to a <u>basic scope statement</u> .	<u>Kick-off meeting</u> evidenced. Detailed <u>Project Charter</u> created, clearly defining all <u>deliverables</u> and <u>Stakeholders</u> . <u>Scope statement</u> developed, <u>identifying acceptance criteria</u> for each <u>deliverable</u> .	/15
5.2 <u>Project Schedule</u>	Limited evidence of tasks to be <u>completed</u> .	Evidence of a <u>project schedule</u> , showing a <u>breakdown of time</u> required to <u>complete essential tasks</u> .	<u>Clear evidence</u> of a <u>project schedule</u> and <u>Work Breakdown Structure</u> . Detailed <u>Gantt chart</u> created to <u>identify all tasks</u> , <u>dependencies</u> and <u>time estimations</u> .	/15
5.3 <u>Budget and Resource Management</u>	Limited evidence of strategies to <u>manage budget</u> and/or <u>resources</u> .	Some evidence of <u>resources</u> required and how they <u>are to be acquired</u> and <u>managed</u> . Some evidence of <u>budgeting</u> .	<u>Clear evidence</u> of <u>budgeting</u> and <u>use of accounting methods</u> to <u>track expenditure</u> . <u>Clear identification</u> of <u>where, when</u> and <u>how resources</u> are to be <u>acquired</u> and <u>used</u> .	/15
5.4 <u>Roles and Responsibilities</u>	Limited evidence of <u>clear roles</u> and <u>responsibilities</u> within <u>team</u> .	<u>Team roles</u> and <u>responsibilities</u> identified, with some <u>evidence of task</u> and/or <u>activity breakdown</u> .	<u>Team members</u> identified and a <u>highly structured team</u> created with <u>clearly defined job functions</u> and <u>appropriate responsibilities</u> . Evidence of a <u>Responsibility Assignment (RACI) Matrix</u> .	/10
5.5 <u>Team & Stakeholder Communications</u>	Limited evidence of <u>engagement</u> between <u>team members</u> and <u>stakeholders</u> .	Evidence of a <u>communication plan</u> and <u>engagements</u> between <u>team members</u> and with <u>stakeholders</u> .	<u>Clear communication plan</u> implemented between <u>team members</u> and <u>stakeholders</u> . <u>Key stakeholders</u> registered and reported to <u>regularly</u> . <u>Multiple communication tools</u> used.	/10
5.6 <u>Risk Management</u>	Limited evidence of <u>risk identification</u> and <u>management</u> .	Evidence of <u>risk identification</u> and <u>response management</u> plans in <u>place</u> .	<u>Clear evidence</u> identifying all <u>relevant risks</u> , <u>area(s) of impact</u> and <u>response planning</u> . <u>Assessment of impact</u> on <u>resources</u> , <u>timing</u> , <u>scope</u> and <u>quality</u> .	/10
5.7 <u>Monitoring & Controlling</u>	Limited or <u>isolated project evaluation</u> .	<u>Ongoing evaluation</u> of most <u>areas</u> . <u>Documented evidence of problems</u> identified and <u>suggested solutions</u> .	<u>Excellent ongoing 'Status Reports'</u> , <u>documenting tasks</u> signed off and <u>highlighting areas of concern</u> . <u>Scope creep</u> identified with a <u>clear action plan</u> for <u>tasks that overrun</u> .	/10
5.8 <u>Skill Development for Future Careers</u>	No or <u>little effort</u> to identify <u>skills</u> and <u>link them</u> to <u>Defence Industry Careers</u> .	A <u>good effort</u> by the <u>team</u> to identify <u>individual skills</u> developed but <u>more work</u> needed to <u>link these</u> with <u>Defence Industry Careers</u> .	<u>Demonstrable evidence</u> in <u>portfolio</u> by <u>team</u> to <u>identify</u> and <u>record</u> several <u>industry specific</u> and <u>employability skills</u> developed through their <u>participation</u> in <u>STEM Racing</u> and <u>how these</u> can <u>link</u> to <u>future careers</u> within <u>Defence Industries</u> .	/15
	Project Management & Career Dev. GRAND TOTAL			/100



CRITERIA 6 - PORTFOLIO: DESIGN - CLARITY & QUALITY SCORE CARD

JUDGING SUB CATEGORY	DESIGN: CLARITY & QUALITY	TEAM ID
PRIMARY EVIDENCE	TEAM ENTERPRISE & ENGINEERING PORTFOLIOS	TEAM NAME
SECONDARY EVIDENCE	NIL	SCHOOL
CRITERIA	6	COMPETITION CLASS

CRITERIA	Low	DEVELOPING		ADVANCED		SCORE
		0 1 1 2 3 0 1 2 3 4 5	2 3 4 5 6 6 7 8 9 10 11 12	4 5 7 8 9 10 13 14 15 16 17 18 19 20		
6.1 Production Quality of Materials	Poor quality.		Basic printing and binding.		Quality printed document on quality paper in appropriately durable binding	/5 /10 /20
6.2 Organisation & Layout	Disorganised content or distracting imperfections weaken the work		Some content organisation with layout design attempted.		Layout consistently applies margins, alignment, spacing, graphics and design elements with consideration of visual balance. All pages optimally used and uncluttered. Creative style realised. Highly organised and managed portfolio content with logical structure and flow of information.	/10
6.3 Typography	Font choices distracting or weaken the work		Some consideration for type treatment.		Consistent use of typography with appropriate choices and limited number of text and headline font sizes, styles, colours and hierarchy. In keeping with branding. Easy to read.	/5
6.4 Photos, Images & Graphics	Poor quality or application of images and graphics. No captioning.		Basic quality and use of images. Some reasonably concise captioning.		Justified use of excellent, un-pixelated, clear, undistorted photos, graphics and images that are concisely and accurately captioned. Properly sized, coloured and integrated with text to illustrate key messages. Considers branding.	/10
6.5 Readability	Spelling and grammatical error ridden. Difficult to understand or read.		Good attempt but requires additional editing for clarity and flow of information.		No errors detected in text and graphics. Concise, appropriate, grammatically correct text, captions and headlines. Inviting and engaging. Sustains the reader's interest	/10
6.6 Referencing	Obvious failures in referencing.		Some attempt at referencing. Some errors evident.		Excellent use of referencing for author's written word, graphics/photos and video sources etc	/20
Clarity & Quality GRAND TOTAL						/60

CRITERIA 7 - MARKETING: BRANDING SCORE CARD

JUDGING SUB CATEGORY	BRANDING	TEAM ID
PRIMARY EVIDENCE	TEAM INTERVIEW AT TRADE BOOTH	TEAM NAME
SECONDARY EVIDENCE	TEAM ENTERPRISE PORTFOLIO	SCHOOL
CRITERIA	7	COMPETITION CLASS

	LOW	DEVELOPING	ADVANCED	SCORE
CRITERIA	01 123	23 456	45 78910	/5 /10
7.1 Team Name*	Irrelevant choice	Limited consideration of meaning	Well considered, meaningful team name appropriate to goals and image projection.	/5
7.2 Logo Development*	Limited ideas & development. No original work evident	Some logo idea progression & creative logo modification of type or graphics noted	A number of logo ideas considered with attention to team goals and identity. Creative & original logo development clearly relates to the team's chosen name, identity and purpose.	/5
7.3 Final Logo Design*	Team logo is absent or confusing	Logo message is simple and obvious	Strong team logo that grabs attention, generates a positive response, and is easily recognised and recalled. Well considered use of colours, type and shapes enhance meaning. In keeping with branding.	/5
7.4 Logo Application	Poor quality reproduction, limited team logo badging	Most items are badged with team logo. Team logo quality diminished when enlarged or reduced across applications.	Team logo scales well to large and small badging applications. All applications are of high quality and appropriately positioned for strong impact.	/5
7.5 Team Branding	Branding message is weak with inconsistent application across the project	Effective team branding consistently applied across project components	Excellent and highly effective messaging of team image. Quality and consistent branding of team name, logo, typography and colours applied across all project elements; portfolio, uniforms, car, display, social media and collateral. Icon, tagline or mascot added to strengthen branding	/10
7.6 Media Exposure	Limited or ineffective	Some development, some impact, some consideration of audience and platforms	Clear, developed, high impact media strategy, including social media. Careful consideration of target audience and suitable platforms. Evidence of attempt to work with media broadcasters/publishers with some documented success	/5
7.7 Team Sponsors & REA Corporate Partners ROI	Little or no ROI. <u>No or some REA CP logos included in project collateral with poor reproduction or visibility.</u>	Sponsorship acknowledged. <u>Some logos included in project collateral with appropriate visibility and reproduction.</u>	Clear and appropriate visibility of team <u>and State (where relevant)</u> sponsors and REA Corporate Partners. Quality reproduction of appropriate sponsor and REA Corporate Partner logos across all project collateral as required. <u>REA Corporate Partner logos MUST be prominent with no other logo larger in size.</u>	/10
7.8 Team Uniform	Ineffective or inconsistent, same or similar to supporters	Basic and consistent across the team, distinct from supporters	Creative and considered use of branding and appropriate styling for all members. Team member names and roles clearly identified. Clearly distinct from supporters	/5
7.9 Team Presence	Not all present / Poor energy	Generally enthusiastic	All team members are appropriately engaging and enthusiastic about their work	/5
7.10 Team Knowledge	Limited engagement	Some members knowledgeable	Each member is highly knowledgeable in their role and also broadly knowledgeable about details of their entry. Able to defer to others with confidence and share project ownership	/5
			Branding GRAND TOTAL	/60

CRITERIA 8 - MARKETING: TRADE DISPLAY SCORE CARD

JUDGING SUB CATEGORY	TRADE DISPLAY	TEAM ID
PRIMARY EVIDENCE	TRADE DISPLAY	TEAM NAME
SECONDARY EVIDENCE	TEAM INTERVIEW, ENTERPRISE PORTFOLIO & DESIGN DEVELOPMENT BRIEF	SCHOOL
CRITERIA	8	COMPETITION CLASS

CRITERIA	SCORE	
	LOW	ADVANCED
	012 01234	78910 1112131415
8.1 Trade Display Design Development	Single or basic concepts and limited development shown.	Several inspired design ideas for different booth features/functions. Clearly justified developments based around research, C8.3 Trade Display Design Developments and other competition requirements. 3D CAD used to design and organise booth elements effectively to maximise use of space and provide a realistic graphical representation of the final display.
8.2 Car Display	Little consideration given to vehicle representation	Excellent design materials and methods used to display the vehicle and its key components to make it a feature of the display.
8.3 Information Design	Limited or repeat of portfolio	Clean, uncluttered and well organised layout of written and graphical information. Conclusive snapshot of team's key messages.
8.4 Visual Design & Impact	Limited or low impact creativity, branding, messaging and recognition of sponsors.	Creative design which is attractive and impactful. Excellent representation of the team name, brand and brand colours. Team message and/or slogan is clearly evident and sponsors are appropriately recognised. Innovative elements add interest and support team messaging.
8.5 Structural Design	No consideration for constraining factors.	Creative and justified structural design with excellent use of space for primary display components. Evidence for considering functionality at events, branding and team messaging, materials, budget, sustainability, transport and assembly constraints.
8.6 Materials Selection & Use	No or limited research into materials with constraining factors in mind. Some problems are evident.	Highly effective choice of materials: Evidence of development considering factors including appearance, budget, sustainability, transport and assembly constraints. Team understands properties of materials used and is able to justify their choices, achieving an excellent finish with evident attention to detail.
8.7 Sustainability	No or limited evidence of sustainability factors taken into consideration.	Strong demonstrated evidence of teams designing trade booths that use minimal energy and materials.
8.8 Packaging Restrictions ¹	Team complies with ALL packaging restrictions as per C8.4 of the Australian Competition Regulations (0, 15, 20, 30, 35 or 50 pts)	
		Trade Booth GRAND TOTAL
		/145

¹ This criteria assessed by the Chair of Judges prior to booth setup and results entered online

CRITERIA 9 - VERBAL PRESENTATION: PRESENTATION TECHNIQUE SCORE CARD

JUDGING SUB CATEGORY	PRESENTATION TECHNIQUE	TEAM ID
PRIMARY EVIDENCE	TEAM PRESENTATION	TEAM NAME
SECONDARY EVIDENCE	VISUAL AIDS	SCHOOL
CRITERIA	9	COMPETITION CLASS

	LOW	DEVELOPING	ADVANCED	SCORE
CRITERIA	0 1 2	3 4 5 6	7 8 9 10	/10
9.1 Presentation Energy	Artificial and/or low energy	Speakers generally enthusiastic with lively delivery	Passionate with effective and appropriate levels of liveliness	/10
9.2 Team Contribution	Minimal team participation	Good contributions from most team members	Excellent team work with all members participating effectively	/10
9.3 Visual Aids	Little use of aids	Some aids used effectively	Well produced, highly relevant and integrated aids effectively improve communication	/10
9.4 Audience Engagement	Minimal engagement	Some audience connection at times	Audience fully engaged and excited throughout presentation	/10
9.5 Articulation	Difficult to understand and/or hear most presenters	Inconsistent speaking ability	Excellent articulation, use of language and voice projection by all members throughout the assessment.	/10
9.6 Structure	No structure presented, difficult to follow.	A basic structure / outline provided and could be followed by audience	Clear presentation outline / overview. Excellent connections between topics and easy for audience to follow	/10
9.7 Timing	Too fast or ran out of time.	Good timing. Balanced topic depth and pace.	Ran on time or just under. Excellent balance of depth for each topic.	/10
			Presentation Technique GRAND TOTAL	/70



CRITERIA 10 - VERBAL PRESENTATION: CONTENT SCORE CARD

JUDGING SUB CATEGORY	PRESENTATION CONTENT	TEAM ID
PRIMARY EVIDENCE	TEAM PRESENTATION	TEAM NAME
SECONDARY EVIDENCE	VISUAL AIDS	SCHOOL
CRITERIA	10	COMPETITION CLASS

CRITERIA	LOW	DEVELOPING	ADVANCED	SCORE
	01 01234 012345	23 5678910 678910112	45 1112131415 1314151617181920	/5 /15 /20
10.1 Team objectives	Limited statement of objectives	Good statement of objectives	Excellent statement of objectives supported by sound reasoning	<u>/5</u>
10.2 Description of Car Product	Basic descriptions	Good description of components and features.	Excellent description of components and features including design decisions.	<u>/5</u>
10.3 Innovation	Little innovation presented	Innovations described and justified	Originality. Clever innovations with high positive project impact	<u>/15</u>
10.4 Refinement	Little refinement presented	Refinement described and justified	Clever refinement with high positive project impact	<u>/15</u>
10.5 Mentoring Collaborations	Little collaboration discussed	Links with industry or higher education described	<u>Mentoring only collaborations with external businesses, industry or higher education, justified with links to learning and project outcomes</u>	<u>/20</u>
10.6 Learning outcomes	No real reflections discussed	Good explanation of some learning outcomes	A range of personal, life-long learning and career skills acquired and identified as project outcomes for a range of team members	<u>/15</u>
10.7 Future Career Aspirations & Research	Little or no thought had been given to future career aspirations.	Evidence of some team members researching careers generally but no linkage to opportunities in Defence or Defence Industries.	It is evident that team members had thoughtfully considered their future career aspirations and undertaken research into how these might be linked with opportunities being offered in Defence Industries.	<u>/15</u>
10.8 Overall clarity	Several concepts lacked clarification	Clear and appropriate concept explanations	Everything presented was understood through excellent explanations	<u>/5</u>
			Content GRAND TOTAL	<u>/95</u>

CRITERIA 11.1 & 11.2 - GRAND PRIX RACE & REACTION TIME SCORE CARD SAMPLE

SAMPLE GRAND PRIX RACE SPREADSHEET

State and National Finals

Team	REACTION LAUNCH RACING								AUTOMATIC LAUNCH RACING								BEST NET LAP		REACTION TIME		BEST CROSS LAP		GRAND PRIX			
	Team Name	School Name	Team ID	Lane 1 Run 1	Lane 1 Run 2	Lane 2 Run 3	Lane 2 Run 4	Lane 3 Run 1	Lane 3 Run 2	Lane 3 Run 3	Lane 3 Run 4	Lane 4 Run 1	Lane 4 Run 2	Lane 4 Run 3	Lane 4 Run 4	Fastest Time	Penalty	Corrected	Rank	Best	Rank	Corrected	Rank	Laps	Finished	Time
Team A	A High School	Team ID 1	Total	1.300	1.345	1.276	1.328	1.122	1.144	1.060	1.075	1.060	0.000	1.060	2	0.189	12	1.276	2	8	TRUE	6.613	2			
			React	0.219	0.202	0.189	0.223	1.122	1.144	1.060	1.075	1.073	0.100	1.173	9	0.144	3	1.335	8	8	TRUE	7.138	8			
			Net Lap	1.081	1.143	1.087	1.105	1.077	1.087	1.073	1.079	1.086	0.000	1.086	4	0.098	1	1.296	4	8	TRUE	6.913	7			
Team B	School Name	Team ID 2	Total	1.261	1.323	1.275	1.235	1.107	1.087	1.073	1.079	1.103	0.150	1.240	11	0.172	10	1.457	10	8	TRUE	7.574	10			
			React	0.153	0.179	0.179	0.144	1.162	1.219	1.119	1.103	1.090	0.300	1.404	15	0.216	15	1.646	15	8	TRUE	8.655	15			
			Net Lap	1.108	1.144	1.096	1.091	1.169	1.117	1.119	1.100	1.090	0.150	1.210	10	0.165	6	1.485	11	8	TRUE	7.728	11			
Team C	School Name	Team ID 3	Total	1.298	1.370	1.356	1.296	1.162	1.219	1.119	1.103	1.085	0.000	1.049	1	0.142	2	1.241	1	8	TRUE	6.473	1			
			React	0.098	0.173	0.270	0.164	1.169	1.117	1.119	1.103	1.085	0.150	1.210	10	0.175	11	1.508	12	8	TRUE	8.115	12			
			Net Lap	1.200	1.197	1.088	1.132	1.169	1.117	1.100	1.090	1.085	0.000	1.049	1	0.174	11	1.324	12	8	TRUE	6.894	6			
Team D	School Name	Team ID 4	Total	2.104	1.451	1.353	1.346	1.162	1.175	1.141	1.135	1.131	0.000	1.130	7	0.170	8	1.306	6	8	TRUE	8.538	13			
			React	1.000	0.172	0.306	0.175	1.162	1.175	1.141	1.135	1.131	0.25	1.377	14	0.159	5	1.561	13	8	TRUE	7.487	9			
			Net Lap	1.176	1.145	1.111	1.132	1.155	1.144	1.060	1.085	1.056	0.050	1.157	8	0.168	7	1.393	9	8	TRUE	8.559	14			
Team E	School Name	Team ID 5	Total	1.335	1.385	2.112	1.392	1.155	1.144	1.060	1.085	1.085	0.000	1.096	5	0.155	4	1.295	3	7	TRUE	6.763	4			
			React	0.165	0.166	1.000	0.220	1.155	1.144	1.060	1.085	1.085	0.000	1.096	5	0.200	14	1.335	7	8	TRUE	6.632	3			
			Net Lap	1.170	1.219	1.112	1.162	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
Team F	School Name	Team ID 6	Total	1.241	1.278	1.451	1.252	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
			React	0.142	0.156	0.387	0.203	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
			Net Lap	1.099	1.122	1.064	1.049	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
Team G	School Name	Team ID 7	Total	1.392	1.504	1.358	1.374	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
			React	0.194	0.229	0.175	0.193	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
			Net Lap	1.198	1.275	1.183	1.181	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
Team H	School Name	Team ID 8	Total	1.373	1.350	1.308	1.458	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
			React	0.170	0.195	0.176	0.314	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
			Net Lap	1.203	1.155	1.130	1.144	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
Team I	School Name	Team ID 9	Total	1.427	2.198	1.311	1.318	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
			React	0.159	1.000	0.167	0.171	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
			Net Lap	1.268	1.198	1.144	1.147	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
Team J	School Name	Team ID 10	Total	2.226	1.438	1.343	1.367	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
			React	1.000	0.187	0.177	0.168	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
			Net Lap	1.226	1.251	1.166	1.199	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
Team K	School Name	Team ID 11	Total	1.423	1.365	2.179	1.406	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
			React	0.208	0.171	1.000	0.216	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
			Net Lap	1.215	1.194	1.179	1.190	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
Team L	School Name	Team ID 12	Total	1.298	1.295	1.385	DNS	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
			React	0.165	0.155	0.279		1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
			Net Lap	1.133	1.140	1.106		1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
Team M	School Name	Team ID 13	Total	1.430	1.335	1.335	1.362	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
			React	0.269	0.200	0.239	0.230	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
			Net Lap	1.161	1.135	1.096	1.112	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
Team N	School Name	Team ID 14	Total	1.305	1.332	1.355	1.433	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
			React	0.202	0.204	0.192	0.246	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			
			Net Lap	1.103	1.128	1.163	1.187	1.162	1.175	1.141	1.135	1.131	0.000	1.103	6	0.192	13	1.305	5	8	TRUE	6.874	5			

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CRITERIA 11.3 - KNOCKOUT RACE SCORE CARD SAMPLE

SAMPLE KNOCKOUT RACE SPREADSHEET																					
State and National Finals																					
1	Team ID 7					0.000	Team ID 7	1.256	FS		1.256	Team ID 7	1.268	1.360	1.268	Team ID 7	1.254	1.224	1.224	Team ID 7	
16	Bye					0.000															
8	Team ID 2	1.357	1.325	0.050	1.375	1.411	Team ID 2	1.393	FS	0.060	1.443										
9	Team ID 11	DNS	1.311	0.100	1.411																
4	Team ID 3	1.425	1.330		1.330	1.330	Team ID 3	1.412	1.346		1.346										
13	Team ID 10	1.357	1.390	0.250	1.607	1.607															
5	Team ID 15	1.453	1.370		1.370	1.370	Team ID 15	1.360	1.422		1.360										
12	Team ID 8	1.364	1.348	0.160	1.498	1.498															
6	Team ID 9	1.447	1.447		1.447	1.447	Team ID 9	1.443	1.325		1.325										
11	Team ID 6	1.466	1.438	0.150	1.588	1.588															
3	Team ID 13	1.395	1.393		1.393	1.393	Team ID 13	1.341	1.313		1.313										
14	Team ID 12	1.281	1.326	0.260	1.531	1.531															
7	Team ID 14	1.264	1.343		1.264	1.264	Team ID 14	1.312	1.433		1.312										
10	Team ID 4	1.351	1.288	0.150	1.438	1.438															
2	Team ID 1	1.403	1.390		1.390	1.390	Team ID 1	1.274	1.327		1.274										
15	Team ID 5	1.410	DNS	0.300	1.710	1.710															

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