LOCAL ADDENDUM TO FORMULA SAE 2024 RULES
V3.4 – August 12, 2024

This Addendum defines Revisions and Clarifications versus the International 2024 Formula SAE-I Rules for the December 2024 Formula SAE-A competition.

An abbreviated Summary of the Changed Clauses in the FSAE-I Rules for 2024 versus 2023 is included in the Revision Summary on Page 4 of the FSAE-I 2024 Rules. There are also other changes beyond these, and also a number revising the ordering of the clauses and the clause number but not creating new design related requirements.

Except where otherwise noted, this Addendum applies to both Internal Combustion Engine Powered Vehicles and Electric Vehicles.
Any new items or significant changes in this 2024 Addendum from the final version of the prior year 2023 Local Addendum, are highlighted in blue text**.**

Teams should particularly note the local requirements relating to On-site Registration, Technical Inspection and Driver Requirements in the Applicable sections of this Addendum.

Note: Wherever it is not clear as to application of the rules to a proposed vehicle design, or a radically new concept is proposed for a vehicle, the team should submit the concept to the Rules Committee in advance and not rely only on the team interpretation of the rules, as they may not have been drafted with this proposed new concept in mind.

Please read all the rules carefully.

OVERVIEW

Scoring

At the Australian event, the general approach will be that Electric and IC Vehicles will compete in the same events, with scores then applied separately to the IC and Electric vehicle classes to determine placings under separate IC and EV Classes. Note that dependent on the number of entries, additional place scoring and prizes beyond the 1st place, may not be available for IC Vehicles. Further details of the awards and scoring will be included in the Event Handbook after Registrations close.

The Maximum Score, and Your Score, and calculation method for will be in line with the 2024 FSAE international Rules other than for the Cost and Design Events.

Vehicle Eligibility

Any team wishing to enter a 2nd Year Car for 2024 must follow the requirements for the Australasian Competition as defined in the Clauses under GR.9.3.2 in this Addendum and must submit the application by the specified date prior to the close of Registration.

Document Submission:
Required documents are listed in Table DR-1, Clause EV.2.3 and the Appendix PDA - 1.

All electronic document submissions must be uploaded by the Team Leader using the email address that was used to register your team.

If you have multiple team entries, please upload your documents for each entry separately using a unique email address.

All documents must be uploaded to
https://docs.google.com/forms/d/e/1FAIpQLScxnR495KHAcnVqu5m1CMl2DztZt32y-oXLackMsVinSOPQUA/viewform

Submissions will only be accessible by SAE-A event organisers, judges and nominated persons.

ELECTRIC VEHICLES

Voltage Definitions

It should be noted that the definitions used in the Formula SAE Rules for High and Low Voltage do not necessarily correlate with the Definitions used by Electrical Authorities in different countries or jurisdictions. In Formula SAE, High Voltage is used to indicate voltage levels which if not adequately isolated or insulated may cause injury or fatality if contacted without wearing adequate protection suitable for the voltage level of the vehicle High Voltage systems

State of Charge

In line with best practice safe handling requirements for Accumulator / Battery packs, it is recommended that Electric Vehicle Accumulators are transported to the competition site with a SoC of not more than 50%.

All teams must be able to accurately identify accumulator state of charge during technical inspection and must also present for approval at Technical Inspection their method of safely charging and discharging their battery pack.

Electric Vehicle Accumulators may not be charged on-site until passed by EV technical inspection or as directed by the EV technical inspectors and must be on-site at the time of team Registration.

Parc Fermé

Following each vehicle's completion of the Endurance event, the vehicle will be impounded in a "Parc Fermé " where further inspection may be carried out on the vehicles so impounded.
This will also apply to all IC and EV cars even if classified as DNF.

Any temperature monitoring device and the Energy Meter will be removed for EV cars in Parc Fermé.

No team members will be allowed to access their vehicle while it is impounded or located in "Parc Fermé", except under the direction of the officials. See further under Dynamic Events - Endurance.

Rules Enquiries

If you have any questions regarding interpretation of the competition rules, please follow steps 1 and 2 below before submitting a question to the Rules Committee.

1. Check the Formula SAE-A Rules Q&A document to see if your query has already been answered.
2. Ask your Team Leader or Faculty Advisor. In many cases they will be able to assist you.
3. Submit a question to the Rules Committee using the "Ask a Question" link on the SAE-A website.

The Rules Committee may require further information from the team prior to finalising an answer and may also require review of the team's FMEA for major variations or new concepts.

Resources
Document templates, forms and guidelines are available from the SAE US and SAE Australasia websites. The Local Website will include all unique locally required forms and additional information documents.

Teams should also refer to and use all available resources on both the US and local websites in order to establish compliant and effective designs.

GR-GENERAL

US RULE	PAGE	CHANGES & CLARIFICATIONS
GR.2.4	6	**Restrictions on Vehicle Use** **Add:** The following further clarification to the US Rules should be noted: These vehicles are not assumed to be capable of performing in other environments, nor other types of competition, where the speed and physical limitations of the Formula SAE competitions evaluation courses, are removed.
GR.4 GR.4.6	7	**RULES AUTHORITY** **Add Clause** a) The SAE-A event will be held under the International Sporting Code of the FIA, the National Competition Rules of Motorsport Australia (formerly CAMS), and the Speed Event Standing Regulations, any relevant Championship Sporting Regulations as approved by Motorsport Australia (MA), these Supplementary Regulations and any Further Regulations and instructions to competitors that may be issued. b) The event shall be a Formula SAE Inc. Club Meeting run under the current year F-SAE Rules and F-SAE-A Rules Addendum. c) This Event will be conducted in compliance with Motorsport Australia OH&S and Risk Management Policies, which can be found on their website at https://motorsport.org.au
GR.8.5	9	**Protest Period** Delete US words and Add: Protests concerning any aspect of the competition must be filed within 60 minutes of the posting of the scores for the event to which the protest relates unless an alternative period is announced by the officials. For Endurance/Efficiency and Overall results, this may be heard the following day, but the protest must be lodged within the nominated 60 minutes on the Sunday
GR.8.6	10	**Decision** **Add following words to clause:** The information that is acceptable to be considered by the judges in reaching a final decision is entirely at the discretion of the judges. Event Officials will be “Judges of Fact” in relation to any protest. Any material that is not supported by FSAE-A’s official recording of data or reports will be excluded.

GR.9.3.2	10	**FSAE Competition Eligibility** **2nd Year Vehicles** **Delete the US words and Add the following for the FSAE-A Competition:** Vehicles that have competed during any one (1) previous Formula SAE year may compete provided that they have been substantially modified from their first competition. Teams proposing to enter a 2nd Year Vehicle must submit a request a minimum of six weeks in advance of the Entry Registration final date in order to be considered for acceptance by the Competition Organisers. Refer Appendix PDA-1 for Dates. This should include a general overview of the reasons behind the proposal and summary of intended changes, but full finalised design details are not required at this stage. Use the form "Proposal to compete with 2nd Year Car" to be available on the FSAE-A website. If accepted, subsequent photographic and design documentation detailing the final modifications are required along with a statement from the team's Faculty Advisor to be submitted. Refer Appendix PDA-1. Penalties for insufficient redesign or insufficient knowledge by the team may be applied during the Design Event. Refer to the Rule S.4.11 "Potential Penalties for Insufficient Redesign".

AD-ADMINISTRATIVE

US RULE	PAGE	CHANGES & CLARIFICATIONS
AD.3.1.4	12	The US Rules State: Each team member may participate at a competition for only one team. This includes competitions where the University enters both IC and EV teams. For clarification, the intent of this rule is that the members competing/presenting in each of the Static and Dynamic events at the competition must be designated as either part of the EV or IC team and cannot cover both vehicles. This does not exclude team members from working on both vehicles or providing other support beyond the designated events.
AD.3.2	**12**	Age Delete US Rule and Add Any defined University Student Team member below the age of 18 years must present a signed declaration by their parent or guardian. A copy of the Age Declaration form will be available on the FSAE-A website.
AD.3.3	**12**	**Driver's Licence and Competition Licence** **Add:** All Drivers of each team must hold the minimum of a Motorsport Australia SPEED Licence; see NCR 47 or the equivalent authority issued by Motorsport Australia. International drivers must apply for an MA SPEED licence and obtain an 'Authority to Compete' from MA. All drivers should obtain their Motorsport Australia licences well in advance of the commencement of the event.

AD.3.4	**12**	**Society Membership** **Delete US words and Add:** Formula SAE-A is open to teams from Australia/NZ universities, TAFE colleges and some overseas teams. All members of Australia/NZ teams must be members of SAE-A. Team members of international teams must be members of their local SAE Society, ATA, IMechE or VDI. If no local society membership is available, they must apply to become members of SAE-A in order to compete at the event. Students can apply to join SAE-A online at: www.saea.com.au. Proof of membership, such as a receipt for membership payment or current membership card, can be provided via electronic upload at the time of registration, or must be presented at the competition.
AD.3.5	**12**	**Medical Insurance** **Add:** Individual medical insurance coverage per the US rule is obviously desirable but government versus private coverage varies significantly around the world. Accordingly, foreign and local teams must ensure that they are adequately covered by their domestic insurance and carry adequate travel medical and accident insurance to cover their time in Australia and at the competition.
AD.3.6	**12**	**AD.3.6 Disabled Accessibility** **Delete USA words and Add** Teams with members who may have special accessibility requirements, must contact the Event Organisers prior to the submission of the final team member list.
AD.4	**12**	**Revise Heading to read:** **INDIVIDUAL & TEAM ON-SITE REGISTRATION REQUIREMENTS**
AD.4.1	**12**	**Delete US Clause**
AD.4.2 **AD.4.2.3**	**12** **12**	**On Site Registration** **Delete US words and add** On Site registration should be completed as soon as possible after the team arrives on site.
AD.4.3	**12**	**Added Clause:** **Team Member Registration - Documentation Required** All participating team members must provide either at the time of online registration, or at the event on-site registration, the following documentation: ● Photographic Identification: e.g. Government issued driver's licence, Government issued proof of age card; passport; University ID card. All forms of photographic identification must be valid at the time of submission. Emergency Contact Information: Each team member must provide the name and phone number of a designated emergency contact.

		• Proof of Society Membership, as per AD3.4 above. • For Team Drivers, Proof of a valid CAMS licence or equivalent authority, as per AD3.3 above. • Hazardous Materials Binder with MSDS sheets.
AD4.4	**12**	**Added Clause:** When teams arrive at the FSAE-A venue and register**, both the Team Captain and the Faculty Advisor (and OH&S representative, if not the Faculty Advisor)** must be present and be able to identify themselves as being those nominated in those roles at the initial online registration. At the on-site registration, all teams must submit a completed **copy of the Technical Inspection Checklist** and a **copy of the Egress Times List** with the names of all drivers and the times they achieved in the Egress test. All EV teams must also submit a completed **copy of the Electrical Inspection Checklist** as primary self-evaluation by the Team. These must be signed by both the Team Captain and the Faculty Advisor. The team must then present the completed Checklists and Egress List at Technical / Electrical Inspection. Electronic copies of these documents must also be submitted 48 hours prior to the event. Refer Appendix PDA-1. The drivers to be required to complete the test for verification at Technical Inspection will be advised at the event. This may or may not include all drivers. Teams should complete on-site registration by the designated time. If not completed by 16:30PM on the Thursday of the Competition at the latest, a penalty of 40 points, will be deducted from their overall score.
AD.5.1 **AD.5.1.4** **AD.5.1.5**	**12** **13** **13**	**Faculty Advisor** **Add the following two clauses:** To improve communication and avoid duplication, all contact between teams and SAE-A officials prior to the event should be in accordance with the FSAE-A Team Communications Protocol. The FA can often help with prior knowledge and interpretations and ensure maximum efficiency in contacts; they may also liaise with other Faculty Advisors. All teams must have a designated OH&S Advisor responsible to ensure compliance with each university's OH&S practices and to ensure the FSAE-A event requirements are also met. The Faculty Advisor shall be the designated OH&S Advisor unless another person is designated by the university to fill this role and SAE-A is notified in writing of their appointment at least two weeks prior to the event. The designated person must attend all days of the event.
AD.6 **AD.6.2.1** **AD.6.2.2** **AD.6.2.3**	**14**	**COMPETITION REGISTRATION** **General Information.** **Registration Details.** **Waitlist**

AD.6.2.4		**Delete US words for these 4 clauses and add:** Formula SAE-A is open to teams from Australia/NZ Universities and TAFE Colleges and some overseas teams. Registration is via the online registration link only. If more than 36 applications are received (32 Max. AV/EV) there may be a limit imposed. This will be monitored and determined by 31 July 2024. If the number of entries exceeds the maximum available event number, then a ballot or other method will be used to reduce the number of overseas entries within the available number of entrants. If a reduction is required to the number of entries, this decision will be announced to the affected overseas teams as soon as possible after the entry closure date.
AD.6.5	**14**	**Withdrawals** **Delete US words and add:** Any team registered for the Australasian competition must notify the organisers via formulasae@sae-a.com.au as soon as any decision is made to withdraw in order to allow other teams the opportunity to compete. Any team which has submitted and EOI for potential entry, but not yet registered must advise via formulasae@sae-a.com.au that they will not be registering as soon as such decision is reached.
AD.7	**14**	**COMPETITION SITE** **Add clauses:**
AD.7.5	**15**	**Fuels, Fluids and Energy Storage :**
AD7.5.1	**15**	Internal Combustion engine vehicles must be drained of fuel before entering the event site for safety and also as only event supplied fuel is to be used.
AD.7.5.2	**15**	Electric Vehicle Accumulators should preferably be discharged to 50% or less state of charge before entering the event site and may not be charged until passed by EV technical inspection or as directed by the EV technical inspectors.
AD7.5.3	**15**	Draining of Fluids. No fluids are to be drained within the pit area except into approved receptacles and no fuels/oil are to be drained in the pit area without prior approval from the organisers and with appropriate fire protection present. Fluid Containers. No open vehicle fluid containers are allowed in the pit area. No fuel or other flammable liquids to be stored on site.

DR-DOCUMENT REQUIREMENTS

US RULE	PAGE	CHANGES & CLARIFICATIONS
DR.2.2 **DR.2.1**	**16**	**Submission Location** **Delete USA Clause and Add:** Teams entering Formula SAE-A competitions in Australia must upload the required documents to the designated submission site as defined in Appendix PDA-1 of this Addendum.

DR.2.2 **DR.2.2.5**	**17**	**Submission Details.** **Add new clause:** Submissions must adhere to standard naming **Car No_ University Name_ses.xls/IAD.pdf/spec.XLS/Design.pdf/Design.mp4/ Cost_Report.xls/Cost_Report.pdf/etc.** and file format to be uploaded to https://docs.google.com/forms/d/e/1FAIpQLScxnR495KHAcnVqu5m1CMl2DztZt32y-oXLackMsVinSOPQUA/viewform
Tables DR	**18**	**Delete US tables and add the new DR-1 and DR-2 Tables as follow:**

Table DR-1 Submission Information
Use the template file or form available from the SAE-A website **AD.2.2.1**

Submission:	Refer to:	File Format:	Group:
Structural Equivalency Spreadsheet(s) (SES) as applicable to your design including the integrated AID report.	**F.2.1**	**XLSX**	Tech
ETC – Notice of Intent	**IC.4.3**	**PDF**	ETC
ETC- Systems Form (ETCSF)	**IC.4.3**	**XLSX**	ETC
EV – Electrical System Advisor and Electrical System Officer Form	**AD.5.2** **AD.5.3**	**PDF**	Tech
EV - Electrical System Form (ESF)	**EV.2.1**	**XLSX**	Tech
Cost Report	**PDA-2** **S.3.4.2**	**PDF**	Cost
Cost Report Support Documentation	**PDA-2** **S.3.4.2**	**XLSX**	Cost
Cost Amendment Report	**PDA-2** **S.3.7.2**	**PDF**	None
Design Briefing	**S.4.3**	**PDF**	Design
Vehicle Drawings	**S.4.4**	**PDF**	Design
Design Specification Sheet	**S.4.5**	**XLSX**	Design

Table DR-2 Submission Penalty Information

Penalty Group	Penalty Points Per Day	Maximum Point Penalty	Not Submitted within 28 days of deadline
Tech	- 5	- 50	Removal of team from applicable event
ETC	Not approved to use ETC. See **DR.3.4.1**		
Cost	- 5	- 80	If not received by end of 10 business days team will receive 0 points for the Cost Report. Refer S.3.6.1
Design	- 5	- 50	Removed from Design Event Score 0 points in Design Event

US RULE	PAGE	CHANGES & CLARIFICATIONS
DR	**16**	**Documentation Requirements**
		Additional Clause for Australasian Event:
DR.4	**18**	In addition to the documents defined for the US event, FSAE-A requires submission of Hazardous Materials Statements and related Material Safety Data Sheets (MSDS) in line with local OH&S practices. The team must prepare a binder listing all hazardous materials and attach the MSDS for all the nominated materials. A preliminary listing should be submitted by the nominated date in Appendix PDA-1 with a final version brought to Team Registration at the Event, The MSDS lists the hazardous ingredients of a product, its physical and chemical characteristics (e.g. flammability, explosive properties), its effect on human health, the chemicals with which it can adversely react, handling precautions, the types of measures that can be used to control exposure, emergency and first aid response, For more information refer to local State Authorities or the Australian Government Safework Australia website.

V-VEHICLE REQUIREMENTS

<table>
<tr><th>US RULE</th><th>PAGE</th><th>CHANGES & CLARIFICATIONS</th></tr>
<tr><td>V.4.3.3</td><td>22</td><td>Tyre Set (Also relates to IN.14.2 on Changes allowed post Inspection)
Add additional clarification clause</td></tr>
<tr><td>V.4.3.3.c</td><td>22</td><td>Tyres and Compounds:
1. Teams should have two sets of tyres - a Dry set and a Wet set.
2. Wiithin each vehicle set, the tyres do not have to be identical composition or size but must be identical Right to Left at Front and Rear but Front and Rear can differ.
3. Teams can have extra Dry or Wet tyres but they must not introduce any difference to the basic sets of tyres as approved at Technical Inspection; a new compound or size cannot be introduced on any replacement tyre that is put onto the vehicle. The replacement tyre must be identical to the tyre it is replacing on the vehicle at that particular corner of the vehicle.
4. If there is a difference in tyres within a TI approved set of Dry (or Wet) tyres, then if replaced each tire must maintain that same combination as presented at TI.
5. So if the following exists at TI,
<table><tr><td>Vehicle Position</td><td>Front LH</td><td>Front RH</td><td>Rear LH</td><td>Rear RH</td></tr><tr><td>Tyre Type</td><td>A</td><td>A</td><td>B</td><td>B</td></tr></table>then any front tyre must be replaced with an A and a rear tyre with B; an A tyre cannot replace a B tyre or vice-versa.</td></tr>
</table>

F-CHASSIS AND STRUCTURAL

US RULE	PAGE	CHANGES & CLARIFICATIONS
F.4.3.2	**129**	**Add new advisory clause F.4.3.2.g** For best design practice and composite performance, the Inner and outer skin layups should both start and end with a woven ply.
F.4.3.6.c	**30**	For clarification of the SES wording to mee the intent of Clause F.4.3.6.c, the SES requirement should be read as meaning – "All material properties in the directions designated by the SES must be 50% or more of those in the 0 direction. The direction which gives the lower result between the 90 and +60/-60 should be used."
F.5.6.2.b	**32**	**Delete the US words and Add:** Any bends in the front view, above or below the Upper Side Impact Structure, must be supported by transverse braces or by triangulation into the Primary Structure. Teams should obviously try to avoid any front view bends, other than as required at the top of the hoop and at the upper attachment to the upper Side impact Structure/monocoque.
F.7.8 **F.7.8.2**	**41** **42**	**Monocoque Attachments** - Explanatory Note: When completing the SES where it requires the "Distance to nearest edge" Cell to be completed, the following is the definition for the dimension to be used and which teams should use in any of their calculations. "Distance to nearest edge" is the dimension from the centre line of the attachment bolt to the nearest monocoque free edge. This dimension must be taken from whichever of the bolt holes is closest to the nearest free edge. Note that the clause 7.8.2 does not negate any of the requirements for the Main Hoop attachments in 7.8.1 and is intended to cover a monocoque which has an open rear or where the monocoque is continuous across the rear joining/closing the two sides.
F.8.2	**43**	**Anti Intrusion Plate - AIP** - Explanatory Notes When completing the SES for an AIP attached via bolting to a monocoque bulkhead the inputs are to ensure an adequate thickness of backing plate supporting the bulkhead to ensure the 15 kN tear out loads are achieved. In the input lines Backing plate thickness and Backing plate perimeter on bulkhead are referring to a backing plate or load spreading washer supporting the bulkhead inserts, not to the AIP dimensions. Minimum Fastener spacing, edge or corner distance must have the minimum distance from the centreline of the bolt to the nearest edge or a corner of the bulkhead, or the spacing between the mounting bolts (at 50 mm Min per F.3.1.b)
F.11.2	**52**	**Accumulator Protection. (F.11.2.1 and 11.2.1.2)** To clarify the height requirements for the Accumulator protection by structure that is at least equivalent to the Side Impact Structure:

F.11.2 (Cont'd)	**52**	Diameter In side view, no part of the Accumulator may be above the height of protecting structure at that point, except where in side view, the part of the Accumulator is above the height of the top of the Side Impact Structure. In Rear view the Rear Impact Structure must extend to the minimum height of the top of the Side Impact Structure. The accumulator itself may extend above that height in rear view. Additionally, spaces or gaps in the Impact Protection Structure must be sized so that a 250 mm diameter ball cannot pass through the structure.
F.11.2.3	**52**	**Accumulator Impact Protection Clearance:** **Clarification note to clause** • Any non-crushable object mounted to the Side or Rear Impact Structure or between the impact Structures and the Accumulator must be included in the clearance measurement (reduces available clearance).

T – TECHNICAL

US RULE	PAGE	CHANGES & CLARIFICATIONS
T.1.5 **T.1.6** **T.1.7** **T.1.8**	**55-57**	**Driver's Seat** **Add Additional Clause** **Seat Structure** In addition to the requirements relating to seating and driver protection in clauses T1.5, T.1.6, T.1.7 and T.1.8, while no structural requirements are included in the Rules, GR.1.5 indicates that an adequately located and fixed seat structure is required to support the driver through a variety of loads during the event. For example, Seats/Drivers should not load the firewall unless the thickness and mounting of the firewall has taken the potential loads into consideration. Potential loads should be considered in the size and placement of related fasteners/fixings/brackets
T.1.9	**58**	**Tractive System Firewalls (EV Only)** As the US 2024 rules no longer provide guidance as to the thickness of the AL Firewall, the following clarifies the expectations for the FSAE-A event. Both T.1.9 and T.1.8 must be met with the latter requiring that the firewall must be made from a rigid non-flammable material and rigidly mounted. To comply, the firewall itself should meets these requirements, without support from other materials and of adequate thickness. The Al must be a minimum of 0.5mm thickness and the traditionally used and readily available 1 mm thick Al sheet (or thicker) would be preferred. Rigidity may be obtained by structural shaping and/or via the edge mounting or addition of Al bracing. The firewall should not deflect into the accumulator clearance zone under a reasonable load such as from a seated driver.

T.1.6 **T.1.6.4**	**53** **53**	**Thermal Protection** **Add Clause** In addition to when seated in normal driving position, the heat protection requirements also apply to areas where contact may be made on entry to, or exit from, the cockpit.
T.2.2.1	**58**	**Harness Specification** **Add additional note to Clause** d. FIA Specification 8853/98 While FSAE International Rules have deleted the FIA 8853/98 homologation. These continue to be permitted by Motorsport Australia, therefore, harnesses to this level will still be accepted at the Australasian event provided they are still within their validity date and have the FIA Hologram on all harnesses manufactured after 01/01/2013. Note that under both 8853/98 and 8853/2016 the shoulder straps must be three inches width if used without a HANS/FHR device, while two inch shoulder belts are acceptable only with a HANS/FHR. A HANS/FHR may be run with a 2 inch or 3 inch belt. Two inch belts are acceptable for the other straps (waist; crotch).
T.3.4 **T.3.4.5**	**64** **64**	**Brake Light** **Add sub-clause T3.4.5** To assist safety / fair play in the endurance event, any vehicle with a brake light illuminated continuously, or under non-braking conditions, will be black flagged.

VE-VEHICLE AND DRIVER EQUIPMENT

US RULE	PAGE	CHANGES & CLARIFICATIONS
VE.1.1	**74**	**Vehicle Number** **Delete US words and Add:** The assigned vehicle numbers must appear on the vehicle as follows: **a)** Locations: In three (3) locations: the **front** and both **sides** **b)** Height: 150 mm (6 inch) high **c)** Font: Helvetica Bold **d)** The numbers do not need to meet the US minimum separation of 18mm but they must not actually overlap. They must be easily differentiated from one another and readable from a distance of at least 100 metres. e) Colour: Day Glo Yellow on a black background f) Background shape: The number background must be one of the following: round, oval, square or rectangular. g) There must be at least 25.4 mm (1 inch) between the edge of the numbers and the edge of the background. **h)** Clear: The numbers must not be obscured by parts of the car, including, but not restricted to wheels, side pods and exhaust system.

VE.1.3	**74**	**Logos** **Delete US words and Add the following clause:** The logos of the major sponsors of the competition, as well as the SAE-A logo, must be displayed on the nose cone of the vehicle, symmetric about the centreline of the vehicle and in a clear space of 210mm wide by 500mm long. The logo files and advice for positioning can be downloaded from the SAE-A website at: https://www.saea.com.au/rules-documents-templates A final list of the required company logos will be released closer to the competition. Failure to use both the correct form and colour of the logos will incur a minimum penalty of 10 Points.
VE.1.4	**74**	**Inspection Stickers** A more compact Inspection Sticker will be used at the 2024 Australasia Event. Accordingly, **Revise first bullet point of US words to** • a clear and unobstructed area, minimum 19 cm wide x 14 cm high
VE.1.5	**74**	**Transponder Delete US words and Add:** Transponders will be used for timing at the Formula SAE-A Event. These will be supplied at the event by the organisers and installed at the officials' direction. They must be mounted to ensure a clear path for the signal between the transponder and ground.
VE.3 **VE.3.3.8**	**75**	**DRIVER EQUIPMENT** **Delete US Clauses VE.3.2.2; VE.3.3.1 to VE.3.3.6. The US Clause VE.3.3.7 (The requirement to wear Arm Restraints) is retained.** **Add additional clause VE.3.3.8:** Driver's equipment must be worn that is in accordance with the following Schedule VE-3. This ensures optimum protection for drivers at the Formula SAE-Australasia event and teams need only refer to the MA Regulations, General Requirements, Schedule D for relevant details. The schedule below, VE-3, also ensures compliance (or above) with the Formula SAE US Rules. The Standard relevant to the Apparel item (Level A, B or C) is defined in Schedule D, Apparel, on the MA website. Go to Schedule D at https://www.motorsport.org.au/docs/default-source/manual/general-requirements/2024/2024-schedule-d.pdf?sfvrsn=dcba5bd4_4 to download the latest PDF update and refer to Section 2, Apparel Standards, and Section 3. Frontal Head Restraints are not required for Formula SAE but are optional. If used, they must comply with the Motorsport Australia schedule. **Schedule VE-3 The Minimum Requirements are:** **Apparel Item** **Level** Helmets: Level B Frontal Head Restraint: Level B Overalls: Level C Underwear: Level B

VE.3.3.8 (Cont'd)	**75**	Balaclava: Level A Shoes: Level B Socks: Level A Gloves: Level A Plus: Arm Restraints SFI Spec 3.3 (minimum)

IC- INTERNAL COMBUSTION ENGINE VEHICLES

US RULE	PAGE	CHANGES & CLARIFICATIONS
IC.5.1 **IC.5.1.4**	**83** **83**	**Fuel** **Add additional clarification clause :** • At the Australasian Event, the fuels supplied will be unleaded petrol with a Research Octane Number (RON) of 98 and Ethanol E85. • Teams must nominate the type of fuel required when they submit their entry registration. Notes: 1. E85 formulation and characteristics may vary between locations and between the fuel obtained by teams during development and that supplied at the event. All US rules relating to ethanol (restrictors, etc.) will apply. 2. All fuel must be drained from the vehicle prior to entering the competition site.
IC.5.4 **IC.5.4.9**	**84** **85**	**Fuel tank Filler Neck and Sight Tube** **Add additional clause:** The filler neck and sight tube must meet the positive fixing/retention requirements for fuel lines as per IC5.8.

EV-ELECTRIC VEHICLES

US RULE	PAGE	CHANGES & CLARIFICATIONS
EV.2 **EV.2.3**	**89**	**DOCUMENTATION** **Add new Clause** **FMEA** Teams should prepare an FMEA as part of their vehicle design process for review by their ESA and team leader. The FMEA will not require to be formally submitted. Any FMEA that is prepared should be brought to the Design Event by the team.
EV.3.2 **EV.3.2.1** **EV.3.2.5**	**89**	**Energy Meter** **Revise second sentence to read:** Refer to the FSAE-A web site for detail information on the Energy Meter. **Add clause to clarify the event supplied meter installation:** The Energy meter must be connected to the TSMPs on the TSMP side of the body protection resistors. Energy Meters will be retrieved from teams at parc fermé after the Endurance event (or earlier for teams that do not complete in the Endurance Event) and analysed after this retrieval.

EV.3.2.6	**89**	**Add additional clause to clarify HV DC measurement cable colour.** The energy meter HV DC measurement cable is exempted from the requirements of EV.6.3.4, to be of Orange colour. No additional covering beyond the existing white insulation sheath is required and should not be added.
EV.4.8	**92**	**Tractive System Part Positioning** There is an incorrect clause reference in the US Rules. **Delete US Words and Add:** All parts belonging to the Tractive System must meet **F.11.**
EV.4.10 **EV.4.10.5**	**92** **92**	**Accumulator Hand Cart** **Add additional Clause** The Hand Cart must be prominently labelled. The label on the Hand Cart must include the vehicle number; the university name; and the ESO phone number(s). The label must be written in Roman Sans-Serif characters of at least 10mm high on the lid or top of each Hand Cart. The characters must be clearly visible and placed on a high-contrast background.
EV.5.6 **EV.5.6.6** **EV.5.6.6 (Cont'd.)**	**95** **95** **95**	**Precharge and Discharge Circuits** **Add Clause defining the PDOC** PDOC. The components within the pre-charge and discharge circuits that dissipate heat (power resistors, linear MOSFETs, heatsinks etc.) must be monitored for thermal overload by a Pre-charge/Discharge Overload Circuit. In the case of a thermal overload, the PDOC must open the shutdown circuit before the components exceed their manufacturer's recommended maximum operating temperature. This must be done without the influence of any programmable logic. See also EV.8 Shutdown Circuit regarding shutdown and reactivation of the tractive system after a fault. The status of the PDOC must be shown to the driver by a red indicator light in the cockpit that is easily visible even in bright sunlight. This indicator must light up, if the PDOC detects a thermal overload of the pre-charge or discharge circuit. The indicator light must be clearly labelled with "PDOC". The PDOC may be omitted if the pre-charge and discharge circuit is designed for continuous operation in a faulted state and will not adversely affect nearby devices. If the PDOC is not fitted, theoretical and experimental evidence must be submitted to demonstrate that the pre-charge and discharge circuit cannot overheat to the point of damage to the vehicle and that the heat generated can be appropriately dissipated when fitted to the vehicle. Any failure modes must be documented in the FMEA with appropriate controls in place as required. If the PDOC is not fitted, then the rationale/evidence must be submitted concurrent with the FMEA timing.
EV.6.3.4	**98**	**Tractive System Wiring outside of electrical enclosures.** In line with Clause EV.3.2.6, the energy meter HV DC measurement cable is exempted from the requirements of this clause. No additional covering beyond the existing white insulation sheath is required and should not be added.

EV.6.4 **EV.6.4.4**	**98**	**CONNECTIONS** **For clarification add Additional Clause** While the rules state specifically that anything in the high current path is a critical fastener, teams should also ensure that other fasteners inside the Accumulator Container do not come undone during vehicle operation, or if they loosen or come undone, they do not pose a risk of a short circuit. A team does not need to positively lock a fastener if they can demonstrate that there is no likelihood of danger or a fire if the fastener fails. If there is a likelihood of fire if the fastener fails, it is classified as critical.
EV.7 **EV7.1.1** **EV.7.1.3** **EV.7.1.4** **EV.7.2.3**	**100** **100** **101** **101** **102**	**Shutdown Systems** **Add revised words to include a PDOC circuit in the following clauses:** **Add Clause** i. Precharge/Discharge Overload Circuit (PDOC) The AMS, IMD, BSPD and PDOC parts of the Shutdown Circuit must be designed as Normally Open contacts The AMS, IMD, BSPD and PDOC must have completely independent circuits to Open the Shutdown Circuit. The respective circuits must be designed such that a failure cannot result in electrical power being fed back into the Shutdown Circuit. When the Shutdown Circuit is Opened by the AMS, IMD, BSPD or PDOC:
EV.7.5 **EV.7.5.5** **EV7.5.8**	**103** **102** **103**	**Accumulator Temperature** **Wording revised for clarification of intent. Delete US words and Add:** For lithium based cells, while it is desirable to monitor the temperature of every cell, **a.** The temperature of at least 20% of the cells must be monitored by the AMS. **b.** The monitored cells must be equally distributed inside the Accumulator Container(s) **Add additional clause:** An independent cell temperature monitoring device will be provided by the officials during accumulator inspection and must be installed, see IN4. The device must be placed on the warmest negative cell terminal of the TSAC and in direct contact with the terminal or less than 30mm away from it on the busbar. The cell monitoring device will be a thermal sensitive sticker, maximum dimensions of 55mm long by 20mm wide by 4mm thick. Teams must provide an easy way for the thermal strip to be accessed during scrutineering and Parc Fermé, such as a hatch or transparent window in the accumulator housing. The maximum allowable window size must not exceed 30mm x 60mm and must be covered by a material equivalent to that defined in F.10.2, or a transparent material meeting F.1.18. This must not reduce the level of structural integrity or Ingress Protection.

EV.7.6	**103**	**Insulation Monitoring Device** **Add the following words to the clause;** In addition to the Bender ISOMETER® IR155-3203 or IR155-3204 as nominated in the Rules, the following alternative IMD's are approved for Formula SAE: • Bender ISOMETER® IR155-3203 or IR155-3204 (currently listed in the Formula SAE Rules)" • Bender ISOMETER® iso165C-1 – this IMD must not connect to the vehicle CAN bus • Bender ISOMETER® iso175 The following IMDs are **Not** Approved • Bender ISOMETER® iso165C • Sendyne/Sensata SIM100MOD • Sendyne/Sensata SIM100MLP • Orion BMS IMD.
EV.7.6.2	**103**	
EV.7.7	**104**	**Brake System Plausibility Device - BSPD** **Add Two additional clauses:**
EV.7.7.5	**104**	**BSPD Circuit Test** Teams must be able to prove the correct function of the BSPD circuit without spinning the vehicle's motors. This test must safely simulate power flow to the motors by injecting a test current directly into the main current sensor (through an auxiliary winding on this sensor for example), while the driver depresses the brake pedal. Teams should detail their test plan in their ESF and FMEA and will be required to demonstrate correct function of the BSPD during EV scrutineering
EV.7.7.6	**104**	The status of the BSPD must be shown to the driver by a red indicator light in the cockpit that is easily visible even in bright sunlight. This indicator must light up, if the BSPD opens the tractive system shutdown circuit.
EV.8	**105**	**CHARGER REQUIEMEMTS** **Add clauses defining the Charger Connector and Power Supply:**
EV.8.1.3	**105**	Electrical power will be supplied for teams to recharge their vehicles via an AS3123 compatible 32 amp, 415 volt, three phase, 5 pin connector. This will be located on a support post outside their pit shed. Teams that require a single phase supply for their chargers shall provide an appropriately tested and tagged breakout box or adapter cable that connects to the 32A 415V 5 pin connector that is provided.
EV.8.2.8	**106**	The AC power supply to the battery charger and other associated devices must include a residual current device (RCD) with over current protection (fuses or an appropriate circuit breaker) or residual current circuit breaker (RCBO). The RCD or RCBO device must act to disconnect both the active and neutral supplies. The trip sensitivity of the RCD must not exceed 30mA. Where possible 10mA is preferred.

IN-TECHNICAL INSPECTION

US RULE	PAGE	CHANGES & CLARIFICATIONS
IN.2	**109**	**INSPECTION CONDUCT** Any other special requirements for Inspection at the Australasian event not listed in this Addendum will be detailed in the Event Handbook and/or on the website.
IN.4	**110**	**ELECTRICAL TECHNICAL INSPECTION (EV)** **Clarification:** At the FSAE-A event, the following procedure will apply to complement the requirements identified in IN-4 per the SAE International Rules. All inspection items per IN.4.1 must be brought to the inspection. **Electric Vehicles Only** Technical Inspection will be a sequential step process as follows: 1. Verification of State of Charge (desirably should be 50% or less) and a visual inspection of all electrical systems and will involve internal inspection of battery packs and all HV system enclosures. Time will be scheduled Thursday and Friday for this inspection. 2. Mechanical Inspection as per the relevant parts of IN.8. 3. Tilt test may be completed after completing part 2. 4. Functional testing where teams will be required to demonstrate correct function of safety systems within the car and final electrical inspection. 5. Installation of the temperature indicating thermal strip and energy meter. Verification of Energy Meter Operation. 6. Teams will be required to complete the above steps before proceeding to brake test, dynamics events, or test pad 7. Teams are not to engage the HVD or power up their cars until their vehicle has advanced with sufficient level of sign-off and the team has been given specific approval to do so by the EV officials.
IN.4.8	**111**	**Added Clause:** **BSPD Circuit Test** BSPD Function and indicator light illumination will be checked in accordance with EV.8.7
IN.5.2 **IN.5.2.3**	**111** **112**	**Egress Test** **Add clause:** A list of the names of all drivers and times they achieved in the test must be provided by each team with the Technical Inspection List at on-site registration. The drivers who will be required to complete the test for verification at Technical Inspection will be identified at the event. This may or may not include all drivers.
IN.6 **IN.6.3**	**108** **112**	**Driver Template** **Add Clause:** To ensure adequate driver protection for varying driving positions, and to ensure a common approach to driver packaging, if the requirements of F5.6.3 to F5.6.5 are not met with the 95th percentile male template, 35 points will be deducted from the team's design event score and the car **will not be allowed to compete in any dynamic events until modified to ensure compliance.** The 915mm minimum dimension of the diagram in F5.6.5 must be maintained.

IN.8.1	**112**	**Inspection Items** **Add the following items to the required list:** • IC cars only with Electronic Throttle Control: ETC Review Form • The tested sample of the Standard IA if required to be tested due to the bulkhead configuration. • The bulkhead sample from the Impact Attenuator Test if not included with the Attenuator
IN.10.2.2	114	**Sound Level Measurement (IC vehicles) – Clarification** The US rules were modified in 2020 to adopt the Australasian approach to sound level measurement for special exhaust configurations but the following more specific test definition is provided for clarity: Height of the sound meter will be such that the vertical level will be determined by placement at an angle of 45° to a projected line of the centreline of the exhaust direction at the outlet. (This will not be at the height of the exhaust outlet except for exhausts exiting parallel to the ground.)
IN.11 **IN.11.4**	**115** **115**	**RAIN TEST (EV ONLY)** **Add Clause** **Sealing** Temporary sealing fixes, such as removable tape, will not be accepted as adequate vehicle design in order to pass the Rain Test.
IN.12 **IN.12.1**	**115** **115**	**BRAKE TEST – IC and EV** **Add Note to Objective clause:** **Brake Light Check** During the brake test IN.12.1and IN.12.2 the officials will assess if the illumination is judged as satisfactory for clear observation in sunlight, by observation from the rear. This will be a subjective judgement.

S-STATIC EVENTS

S2 PRESENTATION EVENT		
US RULE	**PAGE**	**CHANGES AND CLARIFICATIONS**
S.2.2	**118**	**Presentation Concept** The Concept for the Presentation Event at FSAE-A 2021 will be available on the Formula SAE-A website and in the Event Handbook.
		Scoring
S.2.9 **S.2.9.2**	**119**	**Add additional note re scoring method.** A scoring Rubric will be released concurrently with the Presentation concept.
		Add additional Clauses:
S.2.9.4	**119**	At the Australasian Event a nominal timing of 10 minutes is allowed for the team's initial presentation. Teams should try to operate within this guideline and Points will be deducted for significant variations to the guideline, Running under or over by 2 or more minutes will incur a Penalty of 2 Points. Running under or over by 4 or more minutes will incur a Penalty of 4 Points.

S.2.9.5	**119**	Teams which do not meet the concept as required by S.2.2.3, may be penalised up to 50% of the score available.
S.2.9.6	**119**	The initial scoring rubric may be marked to a maximum score other than 75 points. The final scores will be adjusted so that the highest scoring team(s) will be awarded 75 points and all other scores will be adjusted in the same ratio, according to the formula Final Score = SR(your) x 75/SR(max) Where SR(your) is your team's initial score from the rubric and SR(max) is the score of the team(s) achieving the highest initial score from the rubric.

S.3 COST & MANUFACTURING EVENT

For the FSAE-A Event, the complete set of US Rules are replaced by the local event Rules which are detailed in Appendix PDA-2 of this Addendum.

S.4 DESIGN EVENT

The Design Score Sheet can be downloaded the SAE-A website at www.saea.com.au.
The details relating to the conduct of the Design Event will be communicated closer to the event date in the Event Handbook.
Some additional clarifications on Design Documentation and Formats may be provided in the Event Handbook to be published later in the year.

S.4.2 **S.4.2.1**	**122** **122**	**Design Documents – Required Submission** **Delete USA words and add revised wording:** The Design Briefing, Vehicle Drawings, and Design Specification Sheet, must be submitted prior to the event **via the online Formula SAE-A 2024 Document Submissions Google Form.** https://docs.google.com/forms/d/e/1FAIpQLScxnR495KHAcnVqu5m1CMl2DztZt32y-oXLackMsVinSOPQUA/viewform
S.4.3.1	**123**	**Design Briefing** **Delete US Words and Add:** The Design Briefing must follow guidelines defined in *Design Event Overview* document on the FSAE-A Website.
S.4.3 **S.4.3.4**	**122**	**Design Documents Content and Format** **Add extra clause:** All of the Design Document files must be named as follows using the SAE-A assigned car number and the complete school name: ● carnumber_schoolname_Design_Briefing.pdf *Example: 001_University of SAE_Design_Briefing.pdf*

S.4.11	**124**	**Second Year Cars - Penalties for Insufficient Redesign** **Add the following clauses;**
S.4.11.1	**124**	The judges will deduct up to fifty (50) points from the final design score for cars without a new or adequately modified frame. If the frame is similar to last years, it is advisable to bring along evidence of the level of change.
S.4.11.2	**124**	An additional thirty (30) points may be deducted if the photographic and other supporting documentation fails to show that a significant portion of the remaining parts of the vehicle have been significantly changed ((e.g. It is obvious that the old suspension was simply bolted to a new frame, or none of the team members show an understanding of the design of various components).

D-DYNAMIC EVENTS

DYNAMIC EVENTS

The following general rules covering vehicle operation will apply at the FSAE-Australasia for all Dynamic Events and are supplementary to the published USA Formula SAE Rules.

US RULE	PAGE	CHANGES & CLARIFICATIONS
D.3	**125**	**Driving**
D.3.2	**125**	**Dynamic Area Limitations** **Add Additional Clause:**
D.3.2.4	**125**	For all Dynamic Events at the Australasian Competition, a physical "Gate" will apply in the Staging Area. The running times for all Events as listed in the Handbook may be modified on the actual day subject to circumstances. The latest timing will be announced/displayed at the start of each day. Teams should present for each event as soon as ready and/or in accordance with any advised schedule. When ready to run they should enter the Staging Area and will be classified as "Inside the Gate". No work other than adjustments not requiring tools may be performed on the vehicle inside the Gate. If any work is subsequently required, the vehicle must be taken outside the Gate. Closing of the event will proceed via announcements that The Gate is closing 15 minutes before closure and at 5 minutes before closure. It is the responsibility of teams to ensure they are aware of these times. All vehicles inside the Gate and capable of running at the time of closure will be allowed to compete. Vehicles not inside the Gate in a ready to run condition at the Closure time will forfeit their right to compete or undertake any further runs in that event.
D.3.3	**125**	**Driving Under Power**
D.3.3.1	**125**	**For clarification Delete under Clause D.3.3.1 Delete US words and Add** Vehicles may be driven under their own power only when inside the designated Dynamic Areas, (e.g. running in a dynamic event; on the practice track; during brake test) unless otherwise directed by an official.

D.3.5	**126**	**Driver Equipment** **Add Clause**
D.3.5.3	**126**	A "Percy" driver clearance check may be conducted in the staging area by the officials prior to drivers starting in any dynamic event or at any subsequent point if there are concerns regarding compliance with this safety requirements.
D.3.11	**127**	**Add the following clause:** **External Equipment and Work on Vehicles** All vehicles must be capable of start, stop, restart and idle in **all dynamic events**, without external assistance, once the vehicle is on the starting line. This reinforces the requirement that any item essential to satisfactory vehicle operation are included in the cost and design reports for the event. Accordingly, for all dynamic events, from the time that the vehicle is deemed "ready to run" and has moved forward to the starting line under the starter's control, it cannot be worked on and no auxiliary batteries or cooling fans are allowed, until the event is completed (including all heats required to be run consecutively or with some delay under officials' direction). If the vehicle subsequently cannot run it may be removed from the line and repaired but will be deemed to have run "out of order". Additionally, to avoid disruption to the start line, ensure safe operation and not impair clear movement of other vehicles, the above requirements will also apply for vehicles entering the **Staging Area** queue inside the Gate for an event, **unless specific clearance for any work or use of auxiliary equipment has been obtained from the officials controlling that event.**
D.3.12	**127**	**Add additional clause:** **Dynamic Events – Remotely Changing Vehicle Specifications (Telemetry)** In all Dynamic Events, once the vehicle enters the 'hot' or starting area under the official starter's control and until leaving Parc Fermé (where this is applicable), teams are prohibited from transmitting any data to the vehicle that changes. or advises the driver to change, the configurations/parameters of the vehicle. Changes as allowed under IN.14.2.3 are permitted, provided they can be safely performed without any tools on a moving vehicle. Radio communication is permitted between the driver and pit subject to ensuring safe installation of any such equipment. Contravention of this clause will result in zero score for the event concerned. Vehicle condition monitoring and communication with the driver is permitted.
D.4	**127**	**FLAGS** The specific flags to be used at the Australasian event will be clarified at the event's team and driver briefings. Green and red "lollypop" signals may also be used for signalling entry to the track. **Add Clause**
D.4.3	**127**	In cases of excessive non-compliance with safety related flag directions, specific penalties will be applied to teams whose drivers are assessed as not complying with flag directions. These will be assessed by the officials but if a penalty is assessed as being required, the following penalties will generally be applied:

<table>
<tr><td></td><td></td><td>

Failing to pull into the passing diversion under a Blue Flag direction – 5 Second penalty per flag point and/or up to a Black Flag.
Failing to slow down under a Yellow Flag direction – 10 seconds per flag point.
Failing to Stop under a Red Flag direction – 40 seconds per flag point and/or Black Flag.
Failing to obey a Black Flag – Will be assessed on number of non-compliances but may be held in the driver change area and could result in added time penalties and may include disqualification.

Additional Post Endurance penalties may be applied post-event as covered under Clauses D.14.2 and D.14.3.
</td></tr>
<tr><td>D.6.2

D.6.2.3

‘</td><td>128

128</td><td>
Tyre Changes during Endurance

The allowed tire changes and associated conditions are given in the following tables. In recognition of the severe degradation of Wet tyres running on a Dry track, a dispensation to allow a tyre change during Driver Change is added for the Australasian competition and the US Tables are replaced with the following condition and change tables.

<table>
<tr><td rowspan="2">Existing Operating Condition</td><td rowspan="2">Currently Running On</td><td colspan="3">Operating Condition Changed to:</td></tr>
<tr><td>Dry</td><td>Damp</td><td>Wet</td></tr>
<tr><td>Dry</td><td>Dry Tyres</td><td>OK</td><td>A</td><td>B</td></tr>
<tr><td>Damp</td><td>Dry Tyres</td><td>OK</td><td>A</td><td>B</td></tr>
<tr><td>Damp</td><td>Wet Tyres</td><td>C</td><td>D</td><td>OK</td></tr>
<tr><td>Wet</td><td>Wet Tyres</td><td>C</td><td>D</td><td>OK</td></tr>
</table>
<table>
<tr><td>Code</td><td>Requirement</td><td>Allowed at Driver Changge?</td></tr>
<tr><td>A</td><td>May change from Dry to Wet</td><td>Yes</td></tr>
<tr><td>B</td><td>MUST change from Dry to Wet</td><td>Yes</td></tr>
<tr><td>C</td><td>May change from Wet to Dry</td><td>Yes</td></tr>
<tr><td>D</td><td>May change from Wet to Dry</td><td>No</td></tr>
</table>
</td></tr>
<tr><td>D6.2.5

D6.2.5.b</td><td>129

129</td><td>
If the vehicle has a tyre puncture;
Add additional clarification for Australasian Event:

Delete USA words and Add:
Teams that have incurred a puncture during the endurance event due to external factors (e.g. debris on track) may change the tyre within the driver change area, with no time penalty for the tyre change time.

The wheel/tyre removed will be impounded and if, on inspection by the judges, it is subsequently assessed that the deflation/puncture was not caused by external factors, the vehicle will then be given a DNF for the event.

Deflation or punctures caused by running off course or impacting barriers or other objects due to driver error will not be regarded as external factors.
</td></tr>
</table>

D.9 ACCELERATION EVENT		
D.9.1.4	**130**	**Delete US Clause and Add the following words.** Cones will have their base position marked in all events, including Acceleration.
D.11 AUTOCROSS EVENT		
D.11.1	**132**	**Autocross Layout** **Clarification for local event:** The track will generally be similar to the USA rules but teams will be advised of the final layout, the distance to be run for a heat and direction of travel prior to the event. Teams will have the opportunity to walk the track with the Clerk of Course on the Saturday of the event. Minimum track width will be 3.5m.
D.12 ENDURANCE EVENT		
D.12.1 **D.12.1.5**	**134** **134**	**Endurance General Information** **Add the following sentence to the US words:** The number of vehicles on the track simultaneously will be at the discretion of the Clerk of Course but generally will not exceed four.
D.12.2	**134**	**Endurance Layout** **Clarification for local event:** The track will generally be similar to the USA rules but teams will be advised of the final layout and direction of travel on site, prior to the event. Teams will have the opportunity to walk the track with the Clerk of Course on the Saturday of the event. Minimum track width will be 3.5m.
D.12.12 **D.12.12.7**	**137** **137**	**Endurance Penalties** **Add additional clause:** Penalties will not be assessed for accident avoidance or other reason deemed sufficient by the track officials. Adjustments to elapsed time may be made for cases where teams may be halted or disrupted by another team, or by track officials; such adjustments will be entirely at the discretion of the judges/track officials.
D.12.13.3	**138**	**Lap Score for Endurance** **Added Note:** As the full number of laps for Endurance at the FSAE-A Event may not be exactly 25 laps, in order to achieve the maximum score of 275 points for the fastest team(s), completing all laps, an adjustment will be made for the completed laps score in accordance with the following formula, where

D.12.13.3 (Cont'd,)		• 'L' is the full number of laps at FSAE-A and • Laps(your) is the number of completed laps for eligible vehicles Laps Score (your) = Laps(your) x {25/ L). The resultant score will be rounded to one decimal place. This number is added to the Time Score to achieve the overall Endurance Score.

D.13 Efficiency Event

While the overall event and scoring follows the US Rules, for added clarification and adoption of local energy data number, for the FSAE-A Event, the complete set of US Rules are replaced by the local event Rules which are detailed in Appendix PDA-3 of this Addendum.

APPENDIX PDA - 1
Action Deadlines for 2024 Formula SAE Australasia

All submissions must be uploaded via the online Formula SAE-A 2024 Document Submissions Google Form by 5:00 PM (Melbourne local time) on the defined date. Teams should check and allow for time zone and Summer/Standard/Winter-time differences.

The US Rules for late receipt apply, except where otherwise noted earlier in this Addendum.
Forms and templates and details of their required format can be downloaded from the SAE-A website at www.saea.com.au.

All electronic submissions are to be uploaded by the Team Leader to the online Formula SAE-A 2024 Document Submissions Google Form at https://docs.google.com/forms/d/e/1FAIpQLScxnR495KHAcnVqu5m1CMl2DztZt32y-oXLackMsVinSOPQUA/viewform using a University or official team email address. The Team Leader email addresses must be unique for Universities with multiple entries. An email acknowledging receipt will be provided by the Google Forms site. Use the included edit link to submit subsequent documents.

Dates for Autonomous Vehicle teams and Submissions are common with other Dates as shown for the applicable powertrain type. Where unique AV submissions/documentation are required they are shown as a separate line item.

Submissions must adhere to standard file naming and file format listed in Table DR-1.

Other than what is specified for on-site registration, no hard copy submissions will be required.

Date	Milestone/Deadline	Submission Method	Vehicle Type	Event Type
15 Apr	Registration Open for all teams. Registration and payment may be submitted.	Electronic	EV & IC	Dynamic & Static
3 May	Electronic Throttle Control (ETC) Deadline for Notice of Intent submission	Electronic	IC	Dynamic
7 Jun	Application to Compete with 2nd Year Car	Electronic	EV & IC	Dynamic and Static
9 Aug	All Teams: (i) Team Registrations Close (ii) Entry Fees deadline	-	EV & IC	Dynamic & Static
23 Aug	Electrical systems officer and electrical systems advisor forms deadline	Electronic	EV	Dynamic
23 Aug	ESF deadline	Electronic	EV	Dynamic & Static
23 Aug	Autonomous Systems Form	Electronic	EV (AV)	Dynamic & Static
23 Aug	Rationale/Evidence for non-fitment of PDOC	Electronic	EV	Dynamic & Static
23 Aug	Electronic Throttle Control Systems Form	Electronic	IC	Dynamic
23 Aug	Autonomous Vehicle Operation Diagram	Electronic	EV & IC (AV)	Dynamic & Static
23 Aug	Autonomous Vehicle Wiring Diagram	Electronic	EV & IC (AV)	Dynamic & Static
23 Aug	Autonomous Vehicle Schematic Diagrams	Electronic	EV & IC (AV)	Dynamic & Static
13 Sep	Structural Equivalency Spreadsheet deadline including Integral IAD report	Electronic	EV & IC	Dynamic & Static

13 Sep	Autonomous Vehicle Mechanical Parts	Electronic	EV & IC (AV)	Dynamic & Static
13 Sep	Autonomous Hydraulic/Pneumatic Systems	Electronic	EV & IC (AV)	Dynamic & Static
20 Sep	AV teams notice of entry in Static Event(s)	Electronic Word Doc.	EV & IC (AV)	Static
4 Oct	Cost Report and Support Materials deadline	Electronic	EV & IC	Static
4 Oct	Design Briefing, Specifications Sheet and Vehicle Drawings deadline	Electronic	EV & IC	Static
4 Oct	2nd Year car documentation, photograph and details of modification with FA Statement.	Electronic	EV & IC	Static
11 Oct	Motorsport Australia license application submission deadline	Electronic	EV & IC	Dynamic
11 Oct	Declaration of planned hazardous materials and MSDS deadline.	Electronic	EV & IC	Dynamic
21 Oct	Cost Scenario Task Advised to Teams	Email and Website	EV & IC	Static
01 Nov	Final team member list deadline	Electronic	EV & IC	Dynamic & Static
01 Nov	Individual team member registration and fees deadline (All teams).	-	EV & IC	Dynamic & Static
01 Nov	Autonomous Systems Design Report	Electronic	AV	Static
15 Nov	Tech Inspection Checklist including notice of ETC approval; Egress Times List.	Electronic	EV & IC	Dynamic
15 Nov	Electrical Inspection Checklist deadline	Electronic	EV	Dynamic
15 Nov	Autonomous Vehicle Inspection Checklist	Electronic	EV & IC (AV)	Dynamic
4 Dec	Cost Amendment Report – To be submitted at 9:00 AM for review by judges.	Electronic	EV & IC	Static
4 Dec	Bump-In and Team Registration is open from 3pm to 5pm	On Site		
5 Dec	Declaration of final hazardous materials and MSDS deadline; copy of Tech Inspection checklists; copy of Egress Times List.	Hand Deliver at Site Registration	EV & IC	Dynamic
5 Dec	Nomination of Focus Cost System(s) to team	Advised at Registration	EV & IC	Static
5-8 Dec	Formula SAE-Australasia Competition Team Registration is open from 8am to 5pm	On Site		

Rule and Cost enquiries are to be submitted online via the process outlined on the SAE-A website.
https://www.saea.com.au/rules-enquiry
General enquiries may be submitted via email to formulasae@sae-a.com.au

S.3 COST AND MANUFACTURING EVENT

S.3.1 Cost Event Objective

S.3.1.1 The Cost and Manufacturing Event is intended to assess the abilities of each team in relation to manufacturing engineering knowledge and capability, project management with respect to cost-based parameters, and decision trade-offs made between the vehicle manufacturing cost, profitability for the business enterprise per rule GR.1.4.1, and the dynamic performance of the vehicle. Making trade-off decisions between content and cost, based on the performance of each part and assembly, and accounting for each part and process to meet a budget is a critical part of Project Management.

S.3.2 Cost Event Supplementary Information

S.3.2.1 A Cost and Manufacturing Event guide will be published to the SAE-A website containing an overview of costing process and how to fill in the cost report part and assembly data tables.

S.3.2.2 The Cost Catalogues (S.3.8) will be available from the SAE-A website only. Teams should ensure they use the latest version of the catalogues when developing their cost reports.

The catalogues will not be changed for any Add Items Requests, or other requests, from a period 2 calendar weeks in advance to the cost report submission deadline.

S.3.2.2 Submission links for the Cost Report (S.3.4), Cost Amendment Report (S.3.7), and Cost Add Item Requests (S.3.10) will be made available to each registered team by the SAE-A.

S.3.2.4 A Cost and Manufacturing Event Description will be published in the FSAEA Event Handbook, containing an overview of how the event is expected to run, what the specific requirements are to be meet during the event for the team being scored.

S.3.2.5 A Cost and Manufacturing Event Timetable will be published in the FSAEA Event Handbook, and teams must present at the cost event during their allocated time slot.

Allocated time slot changes will only be authorised in exceptional circumstances outside the control of the team, and subject to the Officials' discretion.

S.3.3 Cost Event Areas

S.3.3.1 Cost Report Preparation and submission of a report (the "Cost Report")

S.3.3.2 Event Day Discussion at the Competition with the Cost Judges around the team's vehicle.

S.3.3.3 Cost Scenario where teams will respond to a challenge related to cost or manufacturing of the vehicle (the "Cost Scenario").

S.3.4 Cost Report

S.3.4.1 The Cost Report must:

a. List and cost every part on the vehicle using the standardized Cost Catalogue of Materials, Processes, Fasteners, Tooling, and Multipliers (refer S.3.8).

b. Be based on the actual manufacturing processes used to develop the prototype, with deviations for bulk manufacturing process changes allowed, provided the change is supported with supplementary evidence to support equivalency of the change.

Example 1. A 5-axis milled upright may be costed as initially cast provided the team supplies sufficient evidence to justify the design will be capable of the same level of dynamic performance after such change, in this example with material testing data and completed fully converged computational FEA result.

Example 2. A machining setup process may be reduced in quantity from 1 to a value which is the reciprocal of the number of parts, with parting off allowance, able to be produced from a single standard stock size. This is consistent with bar stock in auto-feeding CNC machines, and with setups on profile cutting beds.

c. Include Tooling Cost (welding jigs, moulds, patterns, and dies) for processes requiring it.

d. Exclude R & D and capital expenditures (plant, machinery, hand tools and power tools).

e. Include supporting documentation to allow officials to verify part costing.

i. For IC vehicles, teams must present at minimum the technical datasheet for the Engine, ECU, and injector/s.

ii. For EV vehicles, teams must present at minimum the technical datasheet for the Accumulator cells, the Battery Management System, the Tractive Motor/s and Controller/s, the main vehicle control module (ECU), and the low voltage battery pack/cells. Additional datasheets may be required for sensors and additional modules if costing of those components can be affected by features of those components.

f. Include a summary with regards to the project cost management, including:

i. A brief summary of decisions made with regards to vehicular performance vs manufacturing costs;

ii. A summary of bulk manufacturing methods used, and how each is applied throughout the cost report.

S.3.4.2 The Cost Report must be submitted in a single PDF Document containing all relevant documentation. The PDF Document is considered the “Cost Report”, and must be submitted to the online submission form. The PDF document should include the cost report summary, the full vehicle Bill Of Materials, the cost section breakdown, all part and assembly data tables, all drawings and supporting documentation, and all datasheets for critical components only. Drawings and supporting documentation are expected to be in close proximity to the part and assembly data tables which refer to the documentation, and datasheets are expected to be located in an addendum at the end of the cost report.

Supporting Excel Documentation (which may be submitted as multiple files) should also be submitted via the online Formula SAE-A Document Submissions Google Form provided by SAE-A, as per S.3.2.

S.3.4.3 The Cost Report PDF document must be limited to <5.0GB in size, due to document submission limitations. If a cost report is, by content inclusion, larger than this size, alternative methods for data transfer must be arranged before the submission deadline.

S.3.5 Bill of Materials – BOM.

S.3.5.1 The BOM is a list for every vehicle part, showing the relationships between the items.

a. The overall vehicle is broken down into separate Systems.

b. Systems are made up of Assemblies.

c. Assemblies are made up of Parts and/or Subassemblies.

d. Subassemblies are made up of Parts and/or other Subassemblies.

e. Parts consist of Materials and/or Fasteners, and Processes.

f. Tooling is associated with each Process that requires production tooling.

S.3.5.2 The BOM is to be integrated into the cost report submission, and should be included in its entirety at the beginning of the cost report.

S.3.5.3 An assembly tree is to be included at the beginning of each system within the cost report, showing the logical progression from each part through subassemblies to the completed system.

S.3.5.4 All parts submitted to the BOM must have matching part numbering to the respective part and assembly data tables and to their respective drawings.

Part Numbering must follow a standardized part naming convention standard. This numbering should produce a code which will be able to positively identify the part with regards to all other parts in the vehicle cost report with a string of characters, ranging in length from 6 to 12 characters, within the part numbering.

It is strongly recommended that the part numbering follow the following format. The characters shown in yellow in the below example are the reference ID which is used by the cost judges to identify errors in your cost accuracy sheets, and no extra time to locate parts will be provided during the cost event based on the use of a complex part numbering convention.

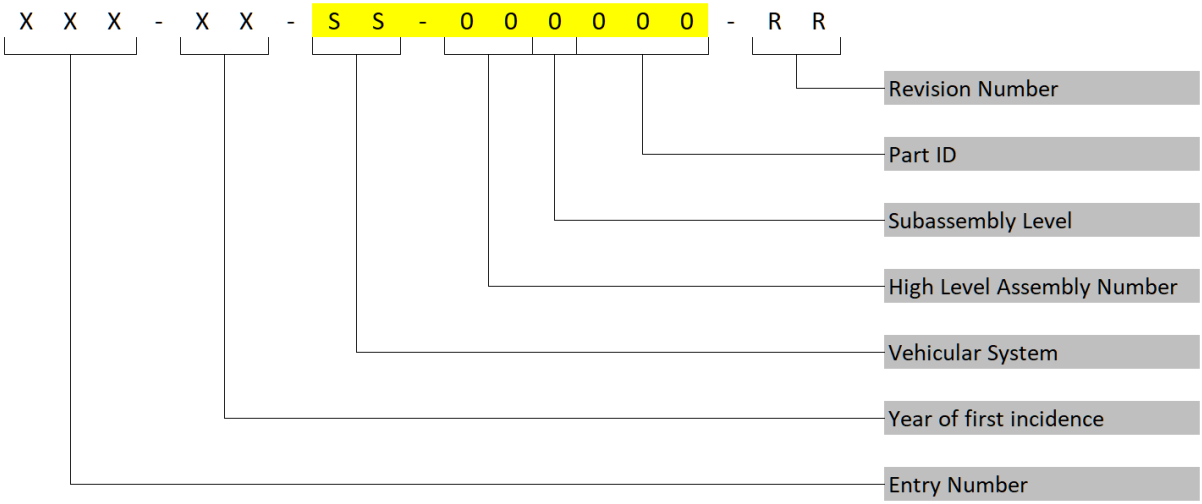

Image S3-1: Recommended part numbering convention for the FSAE-A competition

S.3.6 Late Submission

S.3.6.1 Penalties for late submission shall be imposed as follows:

a. For each business day past submission, a penalty of -5 points will be applied to the team's final cost report score, up to 10 business days past the submission deadline.

b. Any submission not made before close of business on the 10th business day following the original submission deadline will not be eligible for any Cost Report score but may still compete in the Cost Task and Event Day Cost Challenge.

S.3.6.2 An incomplete submission will be defined as any submission which is missing either 1 or more full section of part and assembly data tables, or with over 20% of part and assembly data tables missing. This does not include Autonomous specific parts or assemblies unless the vehicle is registered as an "Autonomous" or "Dual Purpose" vehicle. Incomplete submissions will be treated as equal to a failure to submit, and penalties will accrue accordingly per S.3.6.1.

S.3.7 Cost Amendment Report

S.3.7.1 A supplementary Cost Amendment Report (formerly known as the cost addendum) may be required to be submitted at the event competition if any design or technical changes occur on the prototype between the original cost report submission and the cost event. The intent of this report is to document changes which occur during the prototyping, testing, and development phases of the vehicle project, and the design evolution thereof, and is not intended to be used as a method of completing an incomplete or inaccurate submission of the original cost report.

S.3.7.2 The Cost Amendment Report is to be submitted in PDF format electronically. This submission may be made at any point between the original cost report submission and 9.00am sharp on the Wednesday of competition. Teams are advised that they are only permitted a single Cost Amendment Report Submission, and should plan any submissions accordingly.

S.3.7.3 A specific format for the Cost Amendment Report will be published on the Formula SAE-A website.

S.3.7.4 Cost Amendment Reports apply only to the competition at which they are submitted.

S.3.7.6 Changes to the vehicle costing resulting from changes made in the Cost Amendment Reports will incur additional cost:

a. Added items will be costed at 120% of the catalogue cost: + (1.20 x Cost)

b. Removed items will be credited 80% of the catalogue cost: - (0.80 x Cost)

This cost delta change will be applied at the individual part/assembly level, not at the system level like previous years. This is to combat creative costing which has been used to turn a cost increase into an overall manufacturing cost reduction.

S.3.8 Cost Catalogues

S.3.8.1 All costs in the Cost Report must come from the standardized Cost Catalogue. The Cost Catalogue for the FSAEA competition is found on the Formula SAE-A website, per S.3.2.2.

S.3.8.2 If a team wishes to use any Parts, Processes or Materials not included in the catalogue, an Add Item Request must be submitted. See S.3.10

S.3.9 Make versus Buy

S.3.9.1 All part may be classified as Made or Bought.

S.3.9.2 Some specific parts must be cost as made irrespective of if they are purchased on the prototype. Refer to the SAE-A Website for the latest Cost Catalogue for reference if a part is available for use.

S.3.9.3 If a team genuinely Makes a part listed on the Cost Catalogues as a Bought part, they may alternatively cost it as a Made part.

S.3.9.4 Any part which is normally purchased that is optionally shown as a Made part must have supporting documentation submitted to prove team manufacture.

S.3.9.5 Teams costing Bought parts as Made parts will be penalized. Penalties will be imposed based on the cost of the Bought part, at a cost of 125% of the catalogue price added to the reported price in the cost report.

S.3.10 Add Item Request

S.3.10.1 For the Formula SAE-A event, any Add Item Requests must be submitted via the online FSAEA Cost Add Item Request (CAIR) Google Form, for review and processing by the local Formula SAE-A Cost Committee.

S.3.10.2 A link will be provided to teams to access the Cost Add Item Request Form (CAIR), per S.3.2.2.

S.3.10.3 After review, the item may be added to the Cost Catalogue with an appropriate cost. It will then be available to all teams.

S.3.11 Public Cost Reports

S.3.11.1 The competition organizers may publish all or part of the submitted Cost Reports.

S.3.11.2 Cost Reports for a given competition season will not be published before the end of the calendar year. Support materials, such as technical drawings, will not be released.

S.3.12 Cost Report Penalties Process

S.3.12.1 For the Australasian competition, a two-step cost report penalty process will be followed. The process will be as follows:

a. The raw cost of the vehicle will be used as a base value in which 2 multipliers for accuracy and documentation submission quality will be applied to determine the penalised cost value of the vehicle.

$$\mathrm{P_{(your)}} = \mathrm{P_{(reported)}} * \mathrm{D} * \mathrm{A}$$

where

i. "P(your)" is your penalised vehicle cost.

ii. "P(reported)" is the vehicle cost as reported in the cost report submitted and after processing of any changes made in the Cost Addendum and the targeted component penalty process, if applicable.

iii. "D" is a multiplier used to adjust the cost based on documentation inadequacies and assessing the readiness for manufacturing of your vehicle. This multiplier represents the additional costs produced downstream due to the lack of completeness of the vehicles documentation. The multiplier is calculated as the multiple of the 4 sub-multipliers D1 through D4, as below.

$$D = D_1 * D_2 * D_3 * D_4$$

iv. "A" is a multiplier used to adjust the cost based on the accuracy of the costing calculations presented in the cost report, using a combination of subsections in the vehicles, as described in S.3.17, to determine an estimated accuracy level for the entire cost report submitted. This multiplier represents the additional costs incurred into the vehicle mass production build due to the inaccuracies present in the cost report data, nominally through process and capital planning and execution.

b. For targeted components, where a material is under-quoted at a value greater than or equal to $500, or a process is under-quoted at a value greater than or equal to $50, the cost difference will be added to the reported cost, P(reported), and a ten (10) point deduction in the team's specific accuracy multiplier will be incurred. Targeted components should be assumed to be based on the list of parts requiring datasheets, as per S.3.4.1e, composite monocoques, wheel rims, and tyres.

c. Where missing parts and/or assemblies are identified in the cost report, the following penalties will be added to cost report score post calculation of the cost report section score

(refer S3.3.1), using the P(your) value shown above. This deduction will be referred to as the second step penalty.

i. Missing Hardware – 0.5 points

ii. Missing Part -2 points

iii. Missing Assembly -5 points

S.3.12.2 a. For the purposes of the D4 Documentation sub-multiplier, the FSAEA competition will only require one to two (1-2) system/s to have fully prepared drawings for the grading of this rubric. These systems will be independent of the Accuracy Assessment systems, per rule S.3.17. As such, it is still expected that drawings are submitted for all other sections, but may be at a lower level of quality compared to the target systems for the D4 Documentation sub-multiplier Systems. Examples will be published on the SAE-A website to signify the quality of a fully prepared drawing vs the quality of a general part drawing.

b. For the 2024 FSAEA competition, the nominated system shall be DR (Engine/Tractive Path and Drivetrain).

S.3.12.3 After calculated the adjusted vehicle costs using the formula in S.3.12.1, any vehicle price which exceeds a value of four times (4.0x) the minimum adjusted vehicle cost will receive 0 points for the cost report element of the cost event.

S.3.13 Event Day and Discussion

S.3.13.1 The team must present their vehicle at the designated time.

S.3.13.2 Teams must bring a computer with USB Type A Port capable of running the Cost Report, and any Cost Amendment Report, to the judging. The judges will provide a USB stick loaded with the team's electronic submissions relevant to the cost event.

A computer or other media may be used for presentation of other materials at the event as well as part or assembly data tables, charts, and drawings. Refer to Event Handbook for final details of the FSAE-A Cost Event.

S.3.13.3 The event day discussion will be broken down into 3 specific sections. These will be:

a. A discussion on the cost report as submitted, with an opportunity for teams to challenge potential errors identified in the cost report by the cost judges, and which will ultimately be used to determine the "A" multiplier, as per S3.12.1.

b. A Real-time Costing Challenge, where the team will be asked to cost a small assembly and identify what materials, processes, fasteners, and tooling would be required to manufacture the components and assemble, unaided by the cost report submission. This challenge is to assess the teams specific manufacturing engineering knowledge, specifically relating to process knowledge and reverse engineering capabilities.

c. The Cost Scenario presentation (S.3.14).

S.3.13.4 The real-time costing challenge and the cost scenario will have event score points attributed to both sections independently. The weighting of these sections will be published in the FSAEA Event Handbook.

S.3.13.5 The Cost Judges will:

a. Review whether the Cost Report accurately reflects the vehicle as presented, treated as the prototype for a production vehicle.

b. Review the manufacturing feasibility of the vehicle.

c. Assess supporting documentation based on its quality, accuracy, and thoroughness.

d. Apply penalties for missing or incorrect information in the Cost Report compared to the vehicle presented at inspection.

S.3.13.6 Prior to the cost event all teams are expected to send a student and academic representative to meet for a Cost Briefing, where all details of the event and any updates to the event will be mentioned. The student representative must be either the cost lead, or the student team leader.

S.3.14 Cost Audit

S.3.14.1 Teams may be selected for additional review to verify all processes and materials on their vehicle are in the Cost Report. This may be completed as part of a specific request for assistance from a cost judge, or as part of the cost judge moderation process.

S.3.14.2 Adjustments from the Cost Audit will be included in the final scores.

S.3.15 Cost Scenario

The Cost Scenario will be provided prior to the competition on the FSAE-A Online website – refer to Appendix PDA-1. The Scenario will challenge teams to generate a proposal based on cost and/or manufacturing, and in relation to technical characteristics and business strategy and integration. The team's proposal is expected to be well reasoned, from the initial challenge statement through to the ultimate proposal recommendation, and must include all data used at each step of the process used to generate the recommendation.

S.3.16 Cost Event Scoring

S.3.16.1 The cost report score will be issued as a score out of 80. The cost report score, prior to the omitted item penalisation strategy, will be issued based on the vehicles cost relative to other vehicles in the competition, using the below formula.

$$\text{Cost report score} = 80 * \frac{(\text{Pmax} - \text{Pyour})}{(\text{Pmax} - \text{Pmin})}$$

Where,

i. Pmax is the highest vehicle cost post penalization in the current year competition.
ii. Pmin is the lowest vehicle cost post penalization in the current year competition.
iii. Pyour is your vehicle cost as per as per S.3.12.1

S.3.16.2 The real-time costing challenge score will be issued as a score out of 5, based on the discretion of the cost judging team on assessment that the selected assembly could be produced using the materials, processes, fasteners, and fixtures given during this discussion.

S.3.16.3 The cost scenario score will be issued as a score out of 15, based on the discretion of the cost judging team against a marking rubric, which will be advised in the Event Handbook and on the Formula SAE-A website.

S.3.17 Cost Report Assessment Strategy

S.3.17.1 At the Australasian Event, teams are required to cost and submit a complete cost report per rule S.3.4.2, however judging at the on-site event will review only a specific subset of systems in detail. The chosen systems will be formally advised at the cost briefing before the cost event, and the team's specific accuracy sheet will be distributed to the team electronically at a specific time prior to the teams specific cost event allocated timeslot. The system subset will consist of 1 of 4 system groupings, as follows.

a. DR (Engine/Tractive Path and Drivetrain) and EL (Electrical).

b. CH (Chassis) and MS (Miscellaneous, Fit, and Finish).

c. SU (Suspension), ST (Steering), and BR (Brakes).

d. AD (Aerodynamics) and WT(Wheels and Tyres).

Where a vehicle has little to no aerodynamic devices fitted, the judges may elect to include the ST (Steering) and BR (Brakes) systems to ensure a large enough section of the cost report is reviewed to apply the "A" multiplier equally across all vehicles.

Additionally, vehicles registered as an "Autonomous" or "Dual Purpose" vehicle may have the AV (Autonomous Systems) section audited, at the discretion of the FSAEA competition organizing body and the FSAEA Cost Committee. Any findings from these sections will not be applied in the EV or IC class of a "Dual Purpose" vehicle.

S.3.17.2 Additional high value components may be audited outside of the system groupings shown above, at the discretion of the current years cost judging team.

D.13 EFFICIENCY EVENT

D.13.1 Efficiency Event General Information

D.13.1.1 The Efficiency event evaluates the energy used to complete the Endurance event

D.13.1.2 The Efficiency is derived from chemical stored thermal energy of the fuel consumed or electrical stored energy used, and the lap times on the endurance course, averaged over the length of the event.

D.13.1.3 The Efficiency score is based only on the distance the vehicle runs on the course during the Endurance event, and the total fuel/energy used.

D.13.1.4 Distance for the efficiency event will be taken as the distance travelled to the last passed timing loop by the team being scored.

D.13.1.4 No adjustment to distance or fuel/energy will be made.

D.13.2 Efficiency Event Procedure

D.13.2.1 **For IC vehicles:**

a. The fuel tank must be filled to the fuel level line (IC.5.4.5)

b. During fuelling, once filled to the scribe line, no shaking or tilting of the tank, fuel system, or of the entire vehicle is allowed.

c. The vehicle will then compete in the Endurance event, refer to D.12.5

d. Vehicles must power down immediately upon leaving the course, and be pushed by the team to the 'Parc Fermé' station.

e. The fuel tank must be filled to the fuel level line (IC.5.4.5) to measure fuel used. IC.5.5.1.

f. If the fuel level changes after refuelling:

- Additional fuel will be added to return the fuel tank level to the fuel level line.
- Twice this amount will be added to the previously measured fuel consumption.

g. The officials may selectively shake/vibrate/tilt a vehicle at refuelling following endurance, or in the 'Parc Fermé'.

In the event of any change in level, Clause D13.2.1.f penalties will be applied.

D.13.2.2 **For Electric vehicles**:

a. The vehicle may be at any state of charge as presented at the entry to the endurance event.

b. The vehicle must have a correctly installed energy meter present in the tractive path of the powertrain. Correct function of the energy meter should be verified before entry to the Endurance event.

Correct function of the energy meter will be verified during Technical Inspection.

c. The vehicle will then compete in the Endurance event, refer to D.12.5.

d. Vehicles must power down after immediately upon leaving the course and be pushed to the 'Parc Fermé' station.

e. Energy meters must be removed from the vehicle as soon as possible in Parc Fermé, and passed to race officials for processing.

f. Energy meter data will be downloaded to determine energy used and check for power violations, per EV.4.4. Penalties will be applied per EV.4.5.

D.13.3 Efficiency Eligibility

D.13.3.1 Maximum Time.
Vehicles whose averaged Endurance lap time exceeds 1.45 times the averaged Endurance lap time of the fastest team that is eligible for the efficiency event will receive zero points.

D.13.3.2 Maximum Fuel/Energy Used.
a. IC Vehicles whose corrected average fuel consumption per lap exceeds 26 litre/100 km will receive zero points.
b. EV Vehicles whose corrected average energy consumption per lap exceeds an energy equivalent of 0.4 kWh/km will receive zero points.

D.13.3.3 Partial Completion of Endurance.
a. Vehicles which complete 50% of Endurance and enter the driver change area under power in the Endurance event are eligible for scoring Efficiency points.
b. All other vehicles will receive a score of zero points.

D.13.3.4 Vehicle Condition.
If damage or a potential environmental or safety hazard (such as fuel tank leakage) exists, the fuel tank will not be refilled, and the team will receive zero points for Efficiency

D.13.4 Efficiency Scoring

D.13.4.1 Conversion Factors Each fuel or energy used is converted using the factors:

a. Petrol, 98RON	32,317 kJ/L
b. Race Blend Petrol/Ethanol, E85	22,900 kJ/L
c. Electric	3,600 kJ/kWh

D.13.4.2 EV vehicles will be scored based on their net energy consumption over the endurance event, and full credit will be given to any EV vehicle for energy recovered through regenerative braking.

D.13.4.3 Scoring Term Definitions:

T_{min}	The corrected Endurance time of the team which maintained the highest average speed in the Endurance event and which is eligible for Efficiency.
T_{your}	The corrected Endurance time of the team being scored in the Endurance event.
$n_{min,L}$	The number of laps completed by the teams which set T_{min}.
$n_{min,E}$	The number of laps completed by the teams which set E_{min}.
n_{your}	the number of laps driven by the team being scored.
E_{min}	The calculated energy used by the team for the entire Endurance event with the smallest energy consumption per lap, which is also eligible for Efficiency.
E_{your}	The calculated energy used by the team being scored for the entire Endurance event.
L_{min}	The averaged lap time in the efficiency event of the team which achieved Tmin.
L_{your}	The average lap time in the endurance event of the team being scored.

C_{min}	The average energy consumption per lap of the team with the smallest energy consumption per lap, which is also eligible for Efficiency.
C_{your}	The average energy consumption per lap of the team being scored.
EF_{min}	The efficiency factor of the team with the lowest (worst) efficiency factor.
EF_{max}	The efficiency factor of the team with the highest (best) efficiency factor.
EF_{your}	The efficiency factor of the team been scored.

D.13.4.4 Scoring Formula:

a. The average lap times for each eligible vehicle in the efficiency event will be calculated using the following formula.

i. $L_{min} = \frac{T_{min}}{n_{min,L}}$

ii. $L_{your} = \frac{T_{your}}{n_{your}}$

b. The average energy consumption per lap for each eligible vehicle in the efficiency event will be calculated using the following formula.

iii. $C_{min} = \frac{E_{min}}{n_{min,E}}$

iv. $C_{your} = \frac{E_{your}}{n_{your}}$

c. The Efficiency Factor (EF) for each eligible team will be calculated using the following formula.

v. $EF_{your} = \frac{L_{min}}{L_{your}} * \frac{C_{min}}{C_{your}}$

d. The efficiency score will be calculated using the following formula.

vi. Efficiency Score $= 100 * \frac{EF_{your} - EF_{min}}{EF_{max} - EF_{min}}$