

LOCAL ADDENDUM TO FORMULA SAE 2019 RULES Version 06 – 10 July 2019

This Addendum defines Revisions and Clarifications versus the International 2019 Formula SAE-I Rules for the December 2019 Formula SAE-A competition.

Except where otherwise noted, this Addendum applies to both Internal Combustion Engine Powered Vehicles and Electric Vehicles.

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.

Any updates which are made from the prior issue of the 2019 Addendum are highlighted in blue text.
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 IC 1st, 2nd, etc. and EV 1st, 2nd, etc.

Further details of the awards and scoring will be included in the Event Handbook.

The Maximum Score, and Your Score, and calculation method for each event, will be identical to the 2019 International Rules.

Document Submission:

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 [Formula SAE-A 2019 Document Submission online Google form](#).

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

Transition Rules relating to teams entering Electric Vehicles

Adoption of the options offered is entirely at the discretion of each team.

The Transitional Rules are available to assist teams over a two-year transition period and are intended to support teams seeking to move from IC to EV vehicles as well as teams seeking to support an entry in both classes.

As the intention is to help transition in the short term, these rules will be available for a limited time only. The FSAE-A addendum will provide at least two (2) events notice of an end date beyond which tokens may not be used. At this time it is envisaged that 2022 will be the last year at which the

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Transition Rules will be available to teams. Event organisers reserve the right to change the terms under which tokens may be issued; any changes will be communicated in future FSAE-A Addendums. Refer to Clause A6.9.3 for details.

Partial exemption from Clause A7.2 requirements on team membership for universities with both IC and EV entries is available for teams participating under the transition rules.

EV State Of Charge

In line with international best practice and industry safe handling requirements for Accumulator / Battery packs, Electric Vehicle Accumulators may not enter the event site at a full state of charge (SoC). A maximum limit of 50% SoC must be met before Technical Inspection will proceed.

All teams must be able to accurately identify accumulator state of charge during technical inspection and must also present a method of safely discharging the battery pack at Technical Inspection, regardless of pack SOC.

Accumulators presented for technical inspection exceeding 50% state of charge must be discharged on-site whilst removed from the vehicle, which will require teams to present a safe work method statement, job safety analysis, procedure documentation, nominated persons and relevant technical and safety equipment for safe manipulation of state of charge to a level not exceeding 50%.

Discharging may only take place in the nominated vehicle charging area under supervision. Vehicles will not pass technical inspection with an accumulator state of charge exceeding 50%.

Accumulators may not be charged until passed by EV technical inspection or as directed by the EV technical inspectors.

Parc Ferme

Following each vehicle's completion of the Endurance event, the vehicle will be impounded in a "parc ferme", 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.

The iButton and Energy Meter will be removed for EV cars in Parc Ferme.

No team members will be allowed to access their vehicle while it is impounded or located in the "parc ferme", except under the direction of the officials. See further details 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](#).

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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.

Teams should use all available resources on the web sites in order to establish compliant and effective designs. For example, you can access the SES diagrams and check adequate Bulkhead, Main Hoop and Side Impact configurations from the [SAE US website](#).

GR-GENERAL

US RULE	PAGE	CHANGES & CLARIFICATIONS
GR.1.5	4	<p>Restrictions on Vehicle Use Add:</p> <p>The following further clarification to the US Rules should be noted:</p> <p>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.</p>
GR.2	4	<p>RULES AND ORGANISER AUTHORITY Add Clause</p> <p>a) The SAE-A event will be held under the International Sporting Code of the FIA, the National Competition Rules of CAMS, and the Speed Event Standing Regulations, any relevant Championship Sporting Regulations as approved by CAMS, these Supplementary Regulations and any Further Regulations and instructions to competitors that may be issued.</p> <p>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.</p> <p>c) This Event will be conducted in compliance with CAMS OH&S and Risk Management Policies, which can be found on the CAMS website at www.cams.com.au</p>
GR.2.12	6	
GR.6.6	8	<p>Decision Add following words to clause:</p> <p>The information that is acceptable to be considered by the judges in reaching a final decision is entirely at the discretion of the judges.</p> <p>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.</p>

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GR.7	8	Vehicle Eligibility
GR.7.3.2	8	<p>Second Year Vehicles. Delete US words and Add: FSAE-Australasia allows two groups of prior year vehicles to compete; The first group consists of 2nd or 3rd year admitted to the FSAE-Australasia competition under the “Token” rules in GR.7.4. The second group consists of Second Year Vehicles which have competed during any one (1) previous Formula SAE year, and are not using a Token. This second group may only compete provided that</p> <ul style="list-style-type: none"> i. they have been substantially modified from their prior year entry. Photographic and design documentation detailing the modifications are required, along with a statement from the team’s Faculty Advisor. ii. the vehicle complies with all current year rules. <p>Penalties for insufficient redesign or insufficient knowledge by the team will be applied during the Design Event. A minimum penalty of 25 points will be applied but may be higher depending on the level of redesign.</p>
GR7.4	8	Add New Clause section GR.7.4:
GR.7.4.1		<p>Eligibility using Transition Token Universities registering a vehicle in both IC and EV FSAE-A events are offered one (1) exemption to assist managing the capital expenditure and organisational burden of transitioning to supporting a new powertrain. Enacting the exemption gives a team two (2) tokens allowing second or third year vehicles to enter consecutive year FSAE-A events without penalty under GR.7.3.2 or GR.7.3.3.</p> <ul style="list-style-type: none"> (i). Tokens may only be used in consecutive FSAE-A events, commencing the year in which the exemption is applied for and cannot be deferred. An approved exemption grants one (1) token for the FSAE-A event being entered into and one (1) for the FSAE-A event in the following calendar year. (ii) While both tokens can be used for an IC vehicle, only one token may be applied to an EV entry. Third-year EV entries are not permitted. (iii) Failure for an exempt vehicle to attend the FSAE-A event in which it is entered will forfeit the token used. (iv) Universities wishing to use this exemption must apply for approval at the time of submitting their entry for the event in the first year of exemption.
GR.7.4.2		Universities entering both IC and EV vehicles are not bound to participate in the exemption, nor is there any restriction to run IC and/or EV vehicles at future events after claiming the exemption.
GR.7.4.3		Second and third year vehicles entered under GR.7.4.1 must be compliant with all current rules in any year entered. Modifications for compliance requirements are permitted.
GR.7.4.4		The University must register an EV in each year competing under GR.7.4.1 Universities entering to compete under GR.7.4.1 and failing to do so will forfeit the token allocated for that year.

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GR.7.4.5		Universities are partially exempt from the requirements of AD.3.1.4 when competing using an exemption token per GR.7.4.1 . IC and EV entries may share any number of student members at the university and across all static and dynamic events with the exception of Presentation. In the Dynamic Events a driver cannot drive both IC and EV cars in the same Dynamic Event. Event organisers cannot guarantee event schedule compatibility with availability of student resources.
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AD-ADMINISTRATIVE

US RULE	PAGE	CHANGES & CLARIFICATIONS
AD.3.1.4	11	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.
AD3.1.4 Cont'd.	11	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. (Cont'd.) This does not exclude team members from working on both vehicles or providing other support beyond the designated events.
AD.3.3	11	Driver's Licence and Competition Licence Add: All Drivers of each team must hold the minimum of a CAMS SPEED Licence; see NCR 47 or the equivalent authority issued by CAMS. International drivers must apply for a CAMS SPEED licence and obtain an 'Authority to Compete' from CAMS. All drivers should obtain their CAMS licences well in advance of the commencement of the event.
AD3.4	11	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.

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AD.3.5	11	<p>Medical Insurance Add:</p> <p>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.</p>
AD.4	11	<p>Revise Heading to read: INDIVIDUAL & TEAM ON-SITE REGISTRATION REQUIREMENTS</p>
AD.4.1	11	<p>Delete US Clause</p>
AD.4.3	11	<p>Added Clause:</p> <p>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:</p> <ul style="list-style-type: none"> ● 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 and anyone participating in the Monday "Driver Swap" day, Proof of a valid CAMS licence or equivalent authority, as per AD3.3 above.
AD4.4	11	<p>Added Clause:</p> <p>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.</p> <p>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.</p> <p>All EV teams must also submit a completed copy of the Electrical Inspection Checklist as primary self-evaluation by the Team.</p> <p>These must be signed by both the Team Captain and the Faculty Advisor.</p> <p>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. (Cont'd.)</p>

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<p>AD.4.4 (Cont'd.)</p>		<p>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.</p> <p>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.</p> <p>Per clause AD.4.2.3, this also means teams may not carry out any activity on their vehicle or attend Technical Inspection, which may also result in the team losing their allocated time.</p>
<p>AD.5.1 AD.5.1.4</p> <p>AD.5.1.5</p>	<p>11</p> <p>11</p>	<p>Faculty Advisor Add: To improve communication and avoid duplication, all contact between teams and SAE-A officials prior to the event should be in accordance with the <u>FSAE-A Team Communications Protocol</u>. The FA can often help with prior knowledge and interpretations and ensure maximum efficiency in contacts; they may also liaise with other Faculty Advisors.</p> <p>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.</p> <p>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.</p>
<p>AD.6 AD.6.1 AD.6.2 AD.6.4</p> <p>AD.6.5</p>	<p>13</p> <p>13</p>	<p>COMPETITION REGISTRATION General Information. Registration Details. Waitlist Delete US words for these 3 clauses and add:</p> <p>Formula SAE-A is open to teams from Australia/NZ Universities and TAFE Colleges and some overseas teams.</p> <p>Registration is via the online registration link only. If more than 33 applications are received, there may be a limit imposed. This will be monitored and determined during the period 1 May – 26 July 2019. 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.</p> <p>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. (Cont'd)</p>

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AD.6.5 (Cont'd)		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 AD7.5.1		Fuels, Fluids and Energy Storage : 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		Electric Vehicle Accumulators must 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.
		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.
AD7.5.3		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	15	Submission Details. Add new clause:
DR.2.2.5		Submissions must adhere to standard naming and file format to be uploaded to the Formula SAE-A 2019 Document Submission online Google form : Car No_ University Name_ses.xls/IAD.pdf/spec.XLS/Design.pdf/Design.mp4/ CR_BOM.xls/CR_Supplement.pdf/etc.
Tables DR-1 & DR-2	17	Delete US tables and add the new DR-1 and DR-2 Tables as follow:

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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	T.2.4 Section T.2	XLSX	Tech
Impact Attenuator Data (IAD)	T.2.24	XLSX	Tech
ETC – Notice of Intent	IC.4.3	PDF	ETC
ETC- Failure Modes and Effects Analysis FMEA	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.10.1	PDF	Tech
EV - Failure Modes and Effects Analysis (FMEA)	EV.10.2	XLSX	Tech
Presentation (If required. Not usually required for the FSAE-A event)	S.2.4	See S.2.4	Presentatio n
Cost eBOM	S.3.6	XLSX & PDF	Cost
Cost Report	S.3.7	XLSX & PDF	Cost
Cost Addendum	S.3.9	See S.3.9	None
Design Report	S.4.3	PDF	Design
Design Specification Sheet	S.4.4	XLSX	Design
Design Report Video	S.4.3(A)	mp4	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		
Present	- 5	-50	Removed from Presentation Event Score 0 points in Presentation Event
Cost	- 5	- 50	Removed from Cost Event Score 0 points for Cost Event
Design	- 5	- 50	Removed from Design Event Score 0 points in Design Event

T-TECHNICAL REQUIREMENTS

US RULE	PAGE	CHANGES & CLARIFICATIONS
T.2.35 T.2.35.3	39	<p>Monocoque Main Hoop Delete US words and Add:</p> <p>The Main Hoop must be mechanically attached to the monocoque and must meet T.2.40.</p> <p>a. Three attachments are required on each side. They must be located at the bottom, top, and an intermediate location. Each attachment must meet the load requirements specified in T.2.40.1</p> <p>b. Designs may combine the top of monocoque attachment and the Intermediate attachment but must then show attachment load strength of 45 kN in all directions (1.5 times the requirements of T.2.40.1) for both the combined upper attachment and the lower attachment, on each side.</p>
T.2.40	40	<p>Monocoque Attachments</p> <p>When completing the SES in section T.2.40.6, 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.</p> <p>"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.</p>
T.3.3	43	<p>Driver’s Seat Add clause:</p>
T.3.3.5	44	<p>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.</p>
T.5.3	51	<p>Brake Light Add additional sub-clause:</p>
T.5.3.5		<p>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.</p>

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VE-VEHICLE AND DRIVER EQUIPMENT

US RULE	PAGE	CHANGES & CLARIFICATIONS
VE.1.1	60	<p>Vehicle Number Delete US words and Add:</p> <p>The assigned vehicle numbers must appear on the vehicle as follows:</p> <ol style="list-style-type: none"> a) Locations: In three (3) locations: the front and both sides b) Height: 150 mm (6 inch) high c) Font: Helvetica Bold d) Colour: Day Glo Yellow on a black background e) Background shape: The number background must be one of the following: round, oval, square or rectangular. There must be at least 25.4 mm (1 inch) between the edge of the numbers and the edge of the background. f) 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	60	<p>Logos Add the following clause:</p> <p>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.</p> <p>The logo files and advice for positioning can be downloaded from the SAE-A website at www.saea.com.au. A final list of the required company logos will be released closer to the competition.</p>
VE.1.5	60	<p>Transponder Delete US words and Add:</p> <p>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.</p>
VE.3 VE.3.3.8	62	<p>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 is retained.</p> <p>Add additional clause VE.3.3.8:</p> <p>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 CAMS Regulations, General Requirements, Schedule D for relevant details. The schedule below, VE-3, also ensures compliance (or above) with the Formula SAE US Rules.</p> <p>The Standard relevant to the Apparel item (Level A, B or C) is defined in the CAMS Schedule D. The Minimum Requirements are:</p>

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<p>VE.3.3.8 (Cont'd)</p>	<p>62</p>	<p>Schedule VE-3</p> <table border="0"> <thead> <tr> <th><u>Apparel Item</u></th> <th><u>Level</u></th> </tr> </thead> <tbody> <tr> <td>Helmets:</td> <td>Level B</td> </tr> <tr> <td>Frontal Head Restraint:</td> <td>Level B</td> </tr> <tr> <td>Overalls:</td> <td>Level C</td> </tr> <tr> <td>Underwear:</td> <td>Level A</td> </tr> <tr> <td>Balaclava:</td> <td>Level A</td> </tr> <tr> <td>Shoes:</td> <td>Level B</td> </tr> <tr> <td>Socks:</td> <td>Level A</td> </tr> <tr> <td>Gloves:</td> <td>Level A</td> </tr> </tbody> </table> <p>Refer to the CAMs website and click on Schedule D, Apparel, for the latest update: https://www.cams.com.au/regulations/manual/general-requirements</p>	<u>Apparel Item</u>	<u>Level</u>	Helmets:	Level B	Frontal Head Restraint:	Level B	Overalls:	Level C	Underwear:	Level A	Balaclava:	Level A	Shoes:	Level B	Socks:	Level A	Gloves:	Level A
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IC- INTERNAL COMBUSTION ENGINE VEHICLES

US RULE	PAGE	CHANGES & CLARIFICATIONS
<p>IC.5.2 IC.5.2.4</p>	<p>39</p>	<p>Fuel Add additional clarification clause :</p> <p>At the Australasian Event, the fuels supplied will be unleaded petrol with a Research Octane Number (RON) of 98 and Ethanol E85.</p> <p>Teams must nominate the type of fuel required when they submit their entry registration.</p> <p>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.</p>
<p>IC.5.5 IC.5.5.8</p>	<p>71</p>	<p>Fuel tank Filler Neck and Sight Tube Add additional clause:</p> <p>The filler neck and sight tube must meet the positive fixing/retention requirements for fuel lines as per IC5.8.</p>

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EV-ELECTRIC VEHICLES

US RULE	PAGE	CHANGES & CLARIFICATIONS
EV.5.1.4	83	AMS Temperature Monitoring: Per note in this clause, temperatures will be monitored at the Australasian event.
EV.5.1.12	84	Add additional clause: The internal temperature of the accumulator pack will be monitored at the Australian Competition, via a Maxim iButton (DS1922T-F5) sensor supplied by the organisers at the event. The iButton sensor is to be located within the Accumulator Pack, mounted to thermally connect to the negative cell terminal of the accumulator. The sensor must be mounted on a thermally conductive surface, with a flat area at least the size of the iButton footprint, that is either in direct contact with this terminal or no more than 30mm away from it. Teams will be required to install the sensor during EV Technical Inspection (Step5) into a holder that has been installed by the team prior to the event, using either the appropriate Maxim iButton holder (DS 9093S), or an alternative mounting approach, that is to the satisfaction of the Technical Inspection scrutineers. More details relating to the installation and reading of the iButtons will be available from the Formula SAE-Australasia website and in the Event Handbook. iButton devices will be retrieved from teams at parc ferme after the Endurance event (or earlier for teams that do not complete in the Endurance Event) and analysed after this retrieval. Teams that exceed their allowable accumulator maximum temperature, without the AMS shutting down the vehicle, will receive a zero score for all dynamic events completed before their sensor analysis.
EV.1.4	76	Energy Meter Add clause to clarify the event supplied meter installation:
EV.1.4.11	77	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 ferme after the Endurance event (or earlier for teams that do not complete in the Endurance Event) and analysed after this retrieval.
EV.6.9	89	Pre-Charge and Discharge Circuits Add clause:
EV6.9.7	89	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 (PDOC). 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.7 Shutdown Circuit regarding shutdown and reactivation of the tractive system after a fault.

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EV.6.9.7 (Cont'd.)	89	<p>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”.</p> <p>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.</p> <p>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.</p>
EV.7 EV.7.1 EV.7.1.1 EV.7.2.2 EV.7.2.6 EV.7.2.7	90 90 90 91 91 91	<p>Shutdown Circuit and Systems</p> <p>Activating the Tractive System</p> <p>Add revised words to include the PDOC circuit in the following clauses:</p> <p>The driver must be able to activate or reset the Tractive System from within the cockpit without external assistance except for situations in which the AMS, IMD, BSPD, or PDOC, have shut down the Tractive System.</p> <p>The shutdown circuit consists of at least two (2) master switches, three (3) shutdown buttons, the Brake Over Travel Switch, the Insulation Monitoring Device (IMD), the Inertia Switch, the Brake System Plausibility Device, the PDOC and all required interlocks and the Accumulator Management System (AMS).</p> <p>If the shutdown circuit is opened by the AMS, the IMD, the PDOC or the BSPD the Tractive System must remain disabled until being manually reset by a person directly at the vehicle which is not the driver.</p> <p>Remote reset, for example via WLAN or use of the three shutdown buttons or the TS master switch to reset the AMS, IMD,PDOC or BSPD is not permitted.</p> <p>It must not be possible for the driver to reactivate the tractive system from within the vehicle in case of an AMS, IMD, PDOC or BSPD fault.</p> <p><i>For example: Applying an IMD test resistor between HV+ and GLV system ground must deactivate the system. Disconnecting the test resistor must not reactivate the system. The tractive system must remain inactive until it is manually reset.</i></p>
EV.7.6 EV.7.6.4	94 94	<p>Brake System Plausibility Device (BSPD)</p> <p>Add clause:</p> <p>BSPD Circuit Test</p> <p>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</p>

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EV7.6.5	94	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.
EV9.3	87	Chargers Add clause defining the Charger Connector:
EV9.3.8	87	Electrical power will be supplied for teams to recharge their vehicles via an AS3123 compatible 32 amp, 415 volt, three phase, 5 pin connector, 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.

IN-TECHNICAL INSPECTION

US RULE	PAGE	CHANGES & CLARIFICATIONS
IN.3.1	100	Inspection Items Delete US words and Add: The following must be brought to Initial Inspection: <ul style="list-style-type: none"> • Technical Inspection Form completed and signed by the team • All Driver Equipment per VE.3 to be used by each driver • Fire Extinguishers (for paddock and vehicle) • Wet Tyres • IC cars only with Electronic Throttle Control: ETC FMEA.
IN.4	100	ELECTRICAL TECHNICAL INSPECTION (EV) To clarify the procedure for Electrical Vehicles, the following procedure will apply at the FSAE-A event, to complement the requirements identified in IN-4 per the SAE International Rules. Electric Vehicles Only Technical Inspection will be a sequential step process as follows: <ol style="list-style-type: none"> 1. Verification of 50% maximum State of Charge 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 Maxim iButton 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.

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IN.4.8	101	Added Clause: BSPD Circuit Test BSPD Function and indicator light illumination will be checked in accordance with EV.7.6.4/5.
IN.5.2 IN.5.2.3	102 102	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 to 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	102 102	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 T.2.10.3-5 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 T.2.10.5 must be maintained.
IN.8.1	102	Inspection Items Add the following items to the required list: <ul style="list-style-type: none"> ● The tested sample of the Impact Attenuator, including 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 ● IC cars only with Electronic Throttle Control: ETC FMEA.
IN.10.1	104	Sound Level Measurement (IC vehicles) To clarify the placement of the sound meter in order to get consistency and comparable readings of the actual exhaust sound level, due to potentially significant variations of the direction of the exhaust at the outlet, between vehicles: Delete the US words <ul style="list-style-type: none"> ● free from obstructions ● at the exhaust outlet vertical level ● 0.5 m from the end of the exhaust outlet ● at an angle of 45° with the outlet in the horizontal plane and Add: <ul style="list-style-type: none"> ● free from obstructions ● 0.5 m from the end of the exhaust outlet ● vertical level determined by the following clause; 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.)

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IN.12	106	BRAKE TEST Add clause:
IN.12.4	106	Brake Light Check During the brake test IN.12.4.2/3 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

COST & MANUFACTURING EVENT		
<p>For additional instructions regarding the local FSAE-A Cost Event, and clarifications regarding costing and reports, refer to the Cost Event Supplement document available from the SAE-A website. A number of administrative items previously included in the Rules are now included in the Formula SAE Cost Event Supplement on the USA Formula website, linked from Page 110 of the US Rules.</p>		
US RULE	PAGE	CHANGES & CLARIFICATIONS
S.3.4.1(a)	111	Cost Report Submission Delete US words and Add: The Cost Report must be submitted via the online Formula SAE-A 2019 Document Submissions Google Form .
S.3.12	112	Add Item Request Delete US words in S.3.12.1 and Add: For the Formula SAE-A event, any Add Item Requests must be submitted <u>via the online Formula SAE-A 2019 Document Submissions Google Form</u> for review and processing by the local Formula SAE-A office.
S.3.14	112	Cost Report Penalty Process Note: As in prior competition years, for the Formula SAE-A Cost Event, the points penalties applied may be uniformly less than indicated, dependent on the judges' assessment of the level of errors and quality of submissions across all vehicles. Where missing costs are identified, these will be added at the correct value and a point penalty applied rather than the US Rules approach of a double cost penalty.
S.3.15	113	Delete US words and Add: Teams must bring a computer with USB Type A Port (with minimum 34 x 20 cm screen) capable of running the Cost Report, and the Addendum if applicable, to the judging. The judges will provide a USB stick loaded with the team's electronic submission of the Cost Report eBOM document.

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.		
S.4.2	114	Design Documents – Required Submission Add revised wording:
S.4.2.1	114	The Design Report, the Design Specification Sheet and Design Video, must be submitted prior to the event <u>via the online Formula SAE-A 2019 Document Submissions Google Form</u> .
S.4.3	115	Design Report Content and Format Add:
S.4.3.5		The Design Report file must be named as follows using the SAE-A assigned car number and the complete school name: <ul style="list-style-type: none"> • carnumber_schoolname_Design_Report.pdf <i>Example: 001_University of SAE_Design_Report.pdf</i>
S.4.3 (A)		Add new clauses S.4.3.(A) between S.4.3 and S.4.4:
S.4.3(A).1		Design Video A Design Video with an overview of goals, concept, execution and achievements is to be submitted. With time during the competition limited and judges being split into multiple teams, there will be no opportunity for the team to share this high level vehicle overview. As with the written design report, contents are intentionally not specified.
S.4.3(A).2		The Design video may be up to five minutes in length, with no editing/cuts mid-sentence. Speakers shall be introduced before presenting. Only physical parts/material may be used as visual aids (ie no CAE or computer graphics).
S.4.3(A).3		The Design Video file must be named as follows using the SAE-A assigned car number and the complete school name: <ul style="list-style-type: none"> • carnumber_schoolname_Design_Video.mp4 <i>Example: 001_University of SAE_Design_Video.mp4</i>
S.4.3(A).4		The Design Video must be submitted electronically in H.264, MPEG-4 Part 10, format (*.mp4 file). It may be encoded at up to 30 frames per second and a maximum of 30 MB in file size. Hint: Use Hand Brake or Apple iTunes for video transcoding. An identical high-definition version of the video may <u>optionally</u> be uploaded to YouTube, unlisted, with the URL supplied <u>via the online Formula SAE-A 2019 Document Submissions Google Form</u> , as per Appendix PDA-1.

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S.4.5.3	115	<p>Vehicle Condition Delete US Words and Add:</p> <p>At the judges' discretion, they may decide to not evaluate any vehicle that is presented at the Design event in what they consider to be an unfinished state.</p>
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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.2	117	<p>Pit and Paddock Add the following clause:</p>
D.2.4		<p>Dynamic Events – Remotely Changing Vehicle Specifications (Telemetry) In all Dynamic Events, teams are prohibited from transmitting any data to the vehicle that changes the configurations/parameters of the vehicle from the time the vehicle enters the 'hot' or starting area under the official starter's control and until leaving Parc Ferme (where this applicable).</p> <p>Contravention of this clause will result in zero score for the event concerned. Vehicle condition monitoring and communication with the driver is permitted.</p>
D.3	118	<p>Driving Add the following clause:</p>
D.3.10	119	<p>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.</p> <p>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).</p> <p>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".</p> <p>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 holding queue for an event, unless specific clearance for any work or use of auxiliary equipment has been obtained from the officials controlling that event.</p>

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D.4	119	<p>FLAGS</p> <p>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.</p>
D.10 Autocross Event		
D.10.1	124	<p>Autocross Layout Clarification for local event:</p> <p>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.</p> <p>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.</p>
D.11 Endurance Event		
D.11.1	126	<p>Endurance General Information Add the following sentence to the US words:</p>
D.11.1.5		<p>The number of vehicles on the track simultaneously will be at the discretion of the Clerk of Course but generally will not exceed four.</p>
D.11.2	126	<p>Endurance Layout Clarification for local event:</p> <p>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.</p> <p>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.</p>
D.11.12	129	<p>Endurance Penalties Add additional clause:</p>
D.11.12.7	129	<p>Tyre Changing During the Endurance Event 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.</p> <p>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.</p> <p>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.</p>

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D.11.12.8	129	<p>Add additional clause:</p> <p>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.</p>
D.12 Efficiency Event		
D.12.2	130	<p>Efficiency Procedure</p> <p>Add additional clause:</p>
D.12.2.5 d	131	<p>The officials may selectively shake/vibrate/tilt a vehicle at refuelling following endurance, or in the 'Parc Ferme'.</p> <p>In the event of any change in level, Clause D12.2.5 c penalties will be applied.</p>
D.12.4.1 c	131	<p>Conversion Factors</p> <p>To equate with Australian electricity grid production emissions the following changes are made:</p> <p>Delete: Electric – 0.65 kg of CO₂ per kWh Add: Electric – 0.85 kg of CO₂ per kWh</p>

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APPENDIX PDA - 1 Action Deadlines for 2019 Formula SAE Australasia

All submissions must be uploaded via the online Formula SAE-A 2019 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 2019 Document Submissions Google Form 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.

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

No hard copy submissions will be required.

Date	Milestone/Deadline	Submission Method	Vehicle Type
23 Apr	Registration Opens for all teams. Registration and payment may be submitted.	Electronic	EV & IC
17 May	Electronic Throttle Control (ETC) Notice of Intent to use deadline	Electronic	IC
5 Jul	Team and student entry fees deadline (Australian and New Zealand teams)	-	EV & IC
2 Aug	Team and student entry fees deadline (International teams)	-	EV & IC
6 Sep	Electrical systems officer and electrical systems advisor forms deadline	Electronic	EV
6 Sep	ESF and FMEA deadline	Electronic	EV
13 Sep	Electronic Throttle Control FMEA deadline	Electronic	IC
20 Sep	Structural equivalency form deadline	Electronic	EV & IC
27 Sep	Impact attenuator data deadline	Electronic	EV & IC
4 Oct	Design report, specification sheet and video deadline	Electronic	EV & IC
11 Oct	Cost Report and eBOM deadline	Electronic	EV & IC
25 Oct	Final team member list deadline	Electronic	EV & IC
25 Oct	CAMS license application submission deadline	Electronic	EV & IC
1 Nov	Declaration of planned hazardous materials and MSDS deadline	Electronic	EV & IC

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Date	Milestone/Deadline	Submission Method	Vehicle Type
2 Dec	Tech Inspection Checklist including electronic throttle control deadline; Egress Times List.	Electronic	EV & IC
2 Dec	Electrical Inspection Checklist deadline	Electronic	EV
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
5-8 Dec	Formula SAE-Australasia Competition	-	EV & IC

Rule and Cost enquiries are to be submitted online via the process outlined on the [SAE-A website](#).

General enquiries may be submitted via email to formulasae@sae-a.com.au.