LOCAL ADDENDUM TO FORMULA SAE 2017-18 RULES

Revisions & Clarifications versus the International 2017-18 Formula SAE Rules (**Issue date September 2017)** follow**:**
Except where otherwise noted, the following 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 early sections below**.**

Note; Wherever 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.

Updates from the original issue of the 2018 Addendum are highlighted in blue text**.**
Read all the Rules carefully!

The following general clarifications which are not specific clauses in the published 2017/18 FSAE Rules, will apply at the 2018 FSAE-A Event.

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 new 2017/2018 International Rules.

DOCUMENT SUBMISSION:

All electronic submissions are to be uploaded to the appropriate section of
https://goo.gl/forms/C6NBNMVCj3qQYswU2
by the Team Leader, using a University or official team email address. Hint: when prompted to sign in, select **More options → Create account → I prefer to use my current email address**.
Submissions will only be accessible by SAE-A event organisers, judges and nominated persons.

NEW TRANSITION RULES for ELECTRIC VEHICLES
Recognising the trend to Electric Cars in the future, to assist the transition to, or introduction of, EV entries at the FSAE-A event, a series of new rules clauses are introduced. Adoption of the options offered is entirely at the discretion of each team.

Recognising costs and resource constraints affect many teams desiring to transition to Electric Vehicles, new Transitional Rules are available to assist teams over a two-year transition period. Their intention is to support teams seeking to move from IC to EV vehicles as well as teams seeking to support an entry in both classes.

The details of the new clauses are included in the detail section of this Addendum with addition of Clauses 6.9.3 (a) – (e).
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. 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.

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.

~~**ELECTRIC VEHICLE DOCUMENTATION**~~ This form will not be required to be submitted by EV teams at registration for the 2018 Event.

~~Teams shall provide a statement at on-site registration signed by their Faculty Advisor or other person as an appropriate legal representative of their University, verifying that the actions defined in Sections 1, 2 and 3 below have been implemented and that their vehicle, equipment and procedures used meet or exceed accepted relevant best practice for safety. EV entries will not be eligible for technical scrutineering until this document has been received on-site by an SAE-A event official.~~

~~Section 1. The team have identified, developed, implemented and upheld safety standards and a safe work culture in accordance with applicable University policy and relevant external standards. This includes, but is not limited to:~~

~~a) performing hazard assessments, defining safe work methods and standard operating procedures;~~
~~b) identifying and training nominated persons to work with the traction system (TS);~~
~~c) safety management, including incident response training for all team members who interact with the vehicle TS, provided by qualified persons and covering operational risks associated with AC and DC systems in the range of 60 – 600 Volts,~~
~~d) access to and use of compliant, managed and properly maintained safety equipment, tools and incident response resources; and~~
~~e) compliance with any legal and/or regulatory requirements applicable to both the competition site (Victoria, Australia) and the team's home jurisdiction.~~

~~Section 2. The Accumulator Management System (AMS) has been designed, implemented and validated to comply with all relevant safety requirements of the event rules, including in particular:~~

~~a) All AMS sensors and sensor circuitry used to determine a fault condition have been tested and confirmed for functionality, and have been verified to trigger an appropriate fault response by the AMS;~~
~~b) All AMS sensors and sensor circuitry used to determine a fault condition have been designed and implemented with inherent first-degree redundancy;~~
~~c) The team has verified by testing, an appropriate fault response to all conditions identified in the team's FMEA that lead to vehicle performance degradation and/or HV system shutdown;~~

~~Section 3. The team accepts their responsibility for the function of the vehicle and the university acknowledges that a failure of the vehicle TS or its components and any related liabilities are the responsibility of the university and confirms that they have taken reasonable actions to independently assess their TS for compliance to the intent of the rules and requirements of the competition.~~

~~The detailed format and content of this sign off document will be provided to Faculty Advisors before the event registration deadline. Any requested clarification relating to this item will be handled through discussions with Faculty Advisors and teams during this period.~~

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.

COST REPORT:

Advance warning is given to teams that this will be the last year for dual submission of both Hard Copy and Electronic reports. From 2019, report submissions will be in Electronic format only**.**

PARC FERME
At the 2018 Australasian Event, following completion of some of the Endurance event, all of the vehicles will be impounded in a “parc ferme”, where further inspection may be carried out on the vehicles so impounded.
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.

RULES ENQUIRIES
Teams are reminded that they should review any rules enquiries with their Faculty Advisor prior to submission. 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.

Addendum Revisions and Additions to the International Rules Clauses with US Rule reference by clause/section;

US Rule	Page	Variation
A2	**6**	**ORGANISATION & STATUS of the SAE-A Event** Add; Article **A2.7** 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. 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 under and in accordance with CAMS OH&S and Risk Management Policies, which can be found on the CAMS website at **www.cams.com.au**
A3.8	**7**	**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 limitations and tightly constrained operating confines of the competition's evaluation courses, are removed.
A4.3	**8**	**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 may register to become members of SAE-A in order to compete at the event. Proof of membership, such as a receipt for membership payment, is required at the competition. Students can join SAE-A online at: www.saea.com.au.
A4.5	**9**	**Driver's Licence and Competition Licence** Add; All Drivers of each team must present a valid, government issued, highway driver's licence, containing a photograph. They must also 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
A4.7	**9**	**Medical Insurance** Add: Individual medical insurance coverage per the US wording 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.
A4.8	**9**	Delete US Rule

A4.9	**9**	Add; **Onsite Registration of Individual Team members– Document Copies Required** All participating team members **must,** at the time of onsite registration, provide photo copies of the following documents and emergency contact data to be filed with registration officials: 1) Photographic Identification: Drivers must present a valid, government issued, highway, driver's licence containing a photograph. Non-drivers may provide alternative photographic ID. (e.g. University ID or passport). 2) Emergency Contact Information: Each student must include the name and phone number of a designated contact on their emergency details. 3) Proof of Society Membership. 4) Team drivers at the competition must also present proof of their CAMS accreditation at registration.
A5.1	**10**	**Faculty Advisor** Add; **Article 5.1.4**. To avoid duplication, ensure proper identification of teams and requests, all contact between teams and SAE-A officials prior to the event, should, in the first instance, be via the faculty adviser or reviewed by the advisor prior to submission. The adviser can often help with prior knowledge and interpretations and ensure maximum efficiency in contacts; they may also liaise with other faculty advisers. All teams must have a designated OH&S advisor responsible in line 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 and the designated person must attend all days of the event.
A6.9	**12**	Add; New Clause, **A6.9.3 (a)** 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 S6.15, A6.10: (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. Add; New Clause, **A6.9.3.(b)** 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. Add; New Clause, **A6.9.3.(c)** Second and third year vehicles entered under A6.9.3.(a) must be compliant with all current rules in any year entered. Modifications for compliance requirements are permitted.

A6.9 Cont'd	**12**	Add; New Clause, **A6.9.3.(d)** The University must register an EV in each year competing under A6.9.3.(a). Universities competing under A6.9.3.(a) and failing to do so will forfeit the token allocated for that year. Add; New Clause, **A6.9.3.(e)** Universities are partially exempt from the requirements of A7.2 when competing using an exemption token per A6.9.3.(a). 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.
A7.2	**13**	The US Rules State: "For the purposes of registering and competing, a school's IC team and EV team are considered to be separate and independent entities. A university may register both an IC Team and an EV team in the same competition". For clarification, what has always been the intent of this rule at all events in Australia and overseas 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 other team members from working on both vehicles or providing cross support.
A7.5	**13**	**Registration Requirements for SAE-A Event** Add; Formula SAE-A is open to teams from Australia/NZ Universities and TAFE Colleges and some overseas teams. Registration is via electronic or hard copy application, not via online web site. If more than 30 applications are received, there may be a limit imposed. This will be monitored and determined during the period May 1 – July 27 2018. 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.
A7.7.1	**14**	**Withdrawals.** Delete US Words and Add; Any team registered for the Australasian competition **must notify the organisers** via telephone or 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. Likewise, any team which has indicated potential entry, but not yet registered, is requested to advise that they will not be registering at the earliest possible date (as soon as such decision is reached).
A7.10	**14**	**Formula SAE Australia Registration**. **Clarification of On-Site Team Registration** Add; When teams arrive at the FSAE-A venue and register**, both the Team Captain and the Faculty Advisor (& OH&S representative if not the FA)** 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 Check List** and EV teams must also submit a completed **copy of the Electrical Inspection Check List** as primary self-evaluation by the Team. These must be signed by both the Team Captain & the Faculty Advisor.

<table>
<tr><td>A7.10
Cont'd.</td><td>14</td><td>The team must then present this completed Check List at Technical/Electrical Inspection. Electronic copies of these two documents must also be submitted 48 hours prior to the event. Refer Appendix PDA-1.
On Site Team Vehicle Registration must be completed prior to the team's presentation of their vehicle for Technical Inspection.
Teams should complete registration by the designated time; if not completed by 4:30 PM Thursday at the latest, a penalty of 40 points, will be deducted from their overall score. This may also result in the team losing their allocated time for TI.</td></tr>
<tr><td>A8.4

A8.4.1

A8.4.2

A8.4.3</td><td>15

15

16

16</td><td>Late Submission Penalties (Revised penalties for Formula SAE-A)

Tech and Business Submission Penalty
Delete; US Penalty Box and numbers and Add;

<table><tr><td>Penalty Per Day</td><td>- 5 points</td></tr><tr><td>Maximum Penalty</td><td>- 20 points</td></tr></table>Remainder of 8.4.1 as per US rules.

A8.4.2 is to be read in conjunction with Rule S6.8 "Penalty for Late Submission or Non-submission"
The design report, design spec sheet and design video collectively constitute the "Design Documents". Late submission or failure to submit all, or any one, of the design documents will be penalized at the standard negative five (-5) points per day, capped at (-20) points each item. If your design documents are received more than four (4) weeks late they will be classified as "Not Submitted" and your team will not participate in the design event and will receive zero (0) points for design.
Design Event Submission Penalty
Delete; US Penalty Box and numbers and Add;

<table><tr><td>Penalty Per Day</td><td>- 5 points</td></tr><tr><td>Maximum Penalty</td><td>- 20 points</td></tr><tr><td>Not Submitted</td><td>Removed from Design Event & score zero points</td></tr></table>Remainder of 8.4.2 as per US rules.

Cost Event Submission Penalty
Delete; US Penalty Box and numbers and Add;

<table><tr><td>Penalty Per Week</td><td>- 10 points</td></tr><tr><td>Maximum Penalty</td><td>- 40 points</td></tr><tr><td>Not Submitted > 30 days</td><td>Removed from Cost Event & score zero points</td></tr></table>
Any submission not received within 30 days of the due date will be regarded as a non-submission and the team may not participate in the cost event. Partial penalties will be applied at the judges' discretion for incomplete reports or late submissions of parts of the report.
Remainder of 8.4.3 as per US rules.</td></tr>
<tr><td>A9.6</td><td>18</td><td>Protest Decisions
Add additional words:
The details/materials that are 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 and any material that is not supported by FSAE-A's official recording of data or reports will be excluded.</td></tr>
<tr><td>T1.1</td><td>22</td><td>Technical Inspection
Add;
The team must have a signed, completed copy of the technical inspection check list when their car is presented at technical inspection. Refer A.7.11.
To clarify the procedure for Electrical Vehicles, the following procedure will apply to complement the requirements identified in S2.7.</td></tr>
</table>

T.1.1 Cont'd		Add Clause; **T.1.1 Electric Vehicles Only** Technical Inspection will be a sequential step process as follows: 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 S2.7.1. 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. Teams will be required to complete the above steps before proceeding to brake test, dynamics events, or test pad (see 'Note 1'). Note 1: 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.
T3.1	**24**	**Vehicle Structure – Alternative Frame Rules** **Formula SAE-Australasia will not offer the Alternative Frame Rules for local entries.** Teams that have had their alternative frame approved for competition at another Formula SAE event in the same calendar year will be allowed to compete with that frame at the Australasian event, following submission of proof of acceptance for the prior event.
T3.7	**29**	**Aluminium Tubing Requirements** Delete existing heading and Add **Alternative Metals Tubing Requirements** Add New **Clause 3.7.1 Aluminium Tubing Requirements**. Revise numbering of existing Clauses T3.7.1, T3.7.2 and T3.7.3 to become T3.7.1 (a), T3.7.1 (b) and T3.7.1 (c). Add New **Clause T3.7.2 Titanium and Magnesium Tubing Requirements** If used in allowed areas, Titanium and Magnesium must not be welded and must have a minimum wall thickness of 1.2 mm.
T3.9.1 **T3.9.5 (c)**	**29** **30**	**Structural Equivalency – SES or SRCF Submission** As all teams must submit an SES (even to confirm "no variance"), in addition to revisions from the base case to the tube material, size or section, they must also consider the position and layout of tubing in accordance with applicable areas of the rules (in particular, for front bulkhead support and side impact protection, as various questionable configurations have been observed at the events). Teams must confirm adequate Bulkhead and Main Roll Hoop support in accordance with one of the "OK" configurations shown in Front Bulkhead and Main Roll Hoop Support Configuration examples available at http://www.fsaeonline.com/cdsweb/gen//DocumentResources.aspx The SES/SRCF must demonstrate equivalent crush strength for the configuration of the team's vehicle. A sketch should be included with the structural documentation submitted to show the basic structure and configurations of the various tubes in a steel space frame vehicle, even if the team believes equivalency calculations are not required.

		Acknowledgement Receipt of SES's submitted for vehicles entered into the Australasian event will be acknowledged.
T3.10.5	**33**	**95th percentile male template** Delete; US wording. Add; To ensure adequate driver protection for varying driving positions, and to ensure a common approach to driver packaging, if the requirements of 3.10.4 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 T3.10.4 must be maintained.
T3.34.2	**47**	**Monocoque Main Hoop** Due to concerns with implementing any significant change which may affect commenced vehicle builds, any rule revisions to address concerns with some hybrid Tube/Monocoque structures, will not be implements until the 2019 competition year, either via the International Rules or the local Addendum (with any local revision advised to teams during 2018 in advance of the formal publication of the Addendum). To assist officials' review of alternative approaches, any teams using a hybrid structure with Rear Tube and Monocoque Centre/Front, and which attaches all of part of the rear structure via welding to the Main Hoop (thereby transmitting additional loads via the Main Roll Hoop attachment points), must submit a load calculation to SAE-A by June 15, 2018. The standardised load conditions and requirements for this will be published in a separate document to teams by May 15, 2018.
T4.3.2	**51**	**Heat Protection** Add; 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.
T4.8	**53**	**Driver Egress** Add; 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 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.
T7.4 **7.4.3**	**63**	**Brake Light** Add; **Article 7.4.3** To assist track safety/fair play in the endurance event, any vehicle with a brake light illuminated continuously, or under non-braking conditions, will be black flagged. The brake light illumination will be checked during the brake test and the officials will deem the illumination as either satisfactory or unsatisfactory for external observation. This will be a subjective judgement. If judged unsatisfactory, it must be corrected before the vehicle is permitted to compete in the dynamic events.
T12.2	**69**	**Transponders** Add; Transponders will be used for timing at Formula SAE-A. These will be supplied at the event by the organisers.

T13	**70**	**Logos/Decals** **T13.1.2** Delete existing words. Add: **T13.1.2** Car numbers must appear on the vehicle as follows: Locations: In three (3) locations: the **front** and both **sides**; (a). Height: 150 mm (6 inch) high; (b). 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. Add **T13.5** The logos of the major sponsors of the competition, as well as the SAE-A logo, must be displayed on the nosecone of the vehicle, symmetric about the centreline of the vehicle and in a clear space of 210mm wide by 500mm long. The logo files are available from the SAE-A Office at formulasae@sae-a.com.au. including advice for relative positioning. A final list of the required company logos will be released closer to the competition.
T14.1 **.**	**71**	**Driver's Equipment** Add; Driver's equipment must be worn that is in accordance with the higher of the level required by the Formula SAE International Rules or the CAMS level defined in this Addendum. The standard relevant to the item (Level A, B or C) is defined in the CAMS Regulations where FSAE-A is classified as a Speed Event.. Helmets: Level B Overalls: Level D Underwear: Level B Balaclava: Level C Socks: Level B Shoes: Level B. Gloves: Level B. Refer to the CAMS website and click on Schedule D Apparel for the latest update:- https://www.cams.com.au/motor-sport/regulations/cams-manual/general-requirements While a Head Restraint is not mandatory, an FIA standard device level is also recommended. Some items listed as "Recommended" by CAMS are mandatory from the Formula SAE Rules to the standard defined as a minimum.
T14.2	**71**	**Helmet** Add; In addition to the US or British Standards listed, helmets conforming to Australian Standard AS 1698 or CAMS Schedule D are allowed.
T14.6	**72**	**Underclothing** Must be worn at the Australasian Competition; Delete; US wording "It is strongly recommended that all competitors wear -- " Add; "All competitors **must** wear -----"
Part AF	**78**	**Alternate Frame Rules** This section is not applicable for the Australasian event.

IC2.1	**94**	**Fuel** Delete; US words Add; The primary fuel supplied for the event will be unleaded petrol with a Research Octane Number (RON) of 98. Ethanol E85 will also be provided as an alternative fuel. Teams wishing to compete using E85 **must** advise their intention when they submit their entry registration. Note: 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. All fuel must be drained from the vehicle prior to entering the competition site.
IC2.6	**95**	**Fuel Tank Filler Neck and Sight Tube** Teams are reminded that the filler neck and sight tube must meet the positive fixing/retention requirements for fuel lines as per T1.8 and T1.9.
IC2.7.1	**97**	**Tank Filling Requirements:** Tanks which by design or accident incorporate air pockets will be penalised for any additional fuel that can be added after vehicle movement/shaking/tilting following fuel fill at the end of Endurance. Refer to D8.12.9 later in this Addendum.
EV3.3.3 **EV 3.4.10**	**106** **109**	**Clauses EV 3.3.3** and **3.4.10. Cell segment maximum stored energy.** The note relating to calculation of stored energy is amended to revert in line with the international rules and will use Maximum stack voltage. “The contained energy of a stack is calculated by multiplying the **maximum** stack voltage with the nominal capacity of the used cell(s)”.
EV3.6.3	**110**	**AMS Temperature Monitoring:** **Add:** The internal temperature of the accumulator pack will be monitored at the Australian Competition. Teams may choose to have the temperature measured using either • Non-conductive one-time-use stick-on thermal strips with dimensions of 51x18mm to be supplied by the event officials • A Maxim iButton (DS1922T-F5) sensor supplied and installed by the team using the appropriate Maxim iButton holder (DS 9093S) which will be located internally within the Accumulator Pack. Accumulators will be opened for electrical scrutineering to either fit the thermal strips to surfaces within the pack that are adjacent to the battery sections (or preferably directly stuck on to the battery busbar connections). or inspect and configure the iButton sensor as appropriate. It is a team's responsibility to have an appropriate location able to accommodate and access either device during electrical scrutineering, while the Accumulator Packs are being charged and at any other time the team or organisers request an inspection. Teams using the iButton are responsible for ensuring their devices have sufficient charge to last the entire event; if an iButton device is deemed to be in a low state-of-charge either the team will need to provide a replacement item or otherwise accommodate a thermal strip to complete electrical scrutineering. The iButton device must be placed on the warmest negative cell terminal of the accumulator container and in direct contact with the terminal or no less then 30mm away from it on the busbar. The appropriate location will be checked during the Technical Inspection.

EV3.6.3 Cont'd.	**110**	Teams using iButton sensors must provide sensor serial numbers to officials at the Electrical Technical Inspection. The supplied iButton serial numbers (or that of any replacement approved by officials) must be validated against devices found in cars at scrutineering and any subsequent to remain valid. The thermal strips identify temperature excursions in steps of about 4°C with an accuracy of +/- 1°C. Maxim iButtons are accepted as having +/- 2°C accuracy. Teams that exceed their allowable accumulator maximum temperature beyond the device accuracy without the AMS shutting down the vehicle, will receive a zero score for all dynamic events completed before the latest device inspection. All devices will be read after the completion of Endurance. Teams may request to have their accumulator temperature monitoring devices checked at various times during the competition.
EV4.9.1	**116**	Existing Clause In the tractive system supply wires, see EV4.8, a calibrated energy meter must be inserted at the competition. The energy meter is used to calculate the efficiency score by measuring the total energy being sourced by the accumulator(s). Add: The Energy meter must be connected to the TSMPs on the TSMP side of the body protection resistors. The energy meter will be supplied by officials at the event.
EV5.1	**118**	**Shutdown Circuit** **Add:** 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 EV5.1.4 and EV5.1.5 regarding 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 labeled with "PDOC". "The PDOC may be omitted if the precharge 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 precharge 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."
EV5.1.4	**118**	Add the PDOC to the specified requirements for the AMS, IMD and BSPD.
EV5.1.5	**119**	Revise words to:" It must not be possible for the driver to re-activate the tractive system from within the car in case of an AMS, IMD, BSPD or PDOC fault."
EV7	**124**	**Electrical System Tests**
EV7.3	**125**	**Rain Test.** Vehicles must pass the rain test as defined in EV7.3 which will be applied at the 2018 FSAE-A Event.

EV7.4 **EV7.4.1** **EV7.4.2**	**125** **125**	**Added** Clause **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 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.
EV8.3.3	**121**	**Charger Connector** **Add;** Additional definition as below. 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.
S2.4	**124**	**Items to be Inspected** Add the following items; • IC cars only with Electronic Throttle Control: ETC FMEA. • 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 • EV cars only: Sample of 2 piece Firewall per T4.5.4
S4	**132**	**ARTICLE 4. Cost & ManufacturingEvent** **COST - MATERIALS TABLE:** The following clarifications to the Materials Table will apply for the 2018 SAE-A Event. **Battery Costs: EVs** must use the following cost for Motor Batteries: **-**. Battery, Tractive Lithium; $600/kWh. Note that Battery, Advanced Chemistry, ($65/kg) only applies for IC vehicle batteries and non-tractive applications.. **2.7 Motor, Tractive AC & 2.8 Motor, Tractive DC.** "Cost per kW continuous power rating by manufacturer. Use manufacturer peak power * 0.5 if this figure is not available." **2.5.10 Chassis Control Module + Motor Controller AC** Inverter for one DC drive motor. Use one for each individually-controllable motor. Include the cost for low capacity HV capacitors. The cost is per kW continuous power of the inverter, as rated by manufacturer. If this figure is not available, use (peak power*0.5)." **2.5.11 Chassis Control Module + Motor Controller AC** "Controller for one AC drive motor. You will need one for every motor. Include the cost for low capacity HV capacitors. The cost is per kW continuous power of the controller, as rated by manufacturer. If this figure is not available, use (peak power*0.5). " Teams should ensure they are using the very latest versions of the download tables from the US site for Materials, Processes and Tooling

S4.7	**135**	**Cost Report** **The following general clarifications/requirements apply.** For consistency of costing by all teams, the material multipliers for machining must be applied for all process involving the removal of material by powered equipment, whether this be by turning, grinding, milling, laser or water jet cutting, etc.. Likewise, Chain costs are ($0.05 per cm per row x Length of chain), so a double row chain will be $0.10 per cm. 1) Material sizes, masses and densities are to be provided in a standard unit. For example, in terms of length dimensions, teams need to stipulate the unit being used for each size listed, whether it is mm, cm, m, in., ft., etc. (in short, a number on its own is not good enough). 2) Composite layups must be made clear; listing the final weight is insufficient, especially if different areas vary in layup. It should be possible for judges to readily identify the number and type of layers and processes used as well as the relevant surface area(s). 3) In addition to an Excel version of the eBOM, teams MUST supply an Excel version **and** a PDF version of their cost report. See later detail clauses. The Excel spreadsheet must be submitted as single file to facilitate review and analysis. Engine cost includes transmission (whether integral or not by design), components used to transfer power between engine and transmission and all components necessary to run including spark plugs, coils, wires, oil filter, etc. with the exception of the air induction and fuel system components. Any driveline component downstream of the transmission output gear/shaft is not included. Cost includes engine as received by manufacturer, but not custom parts such as dry sump pans, PCV changes, etc. Fully internal engine changes are free. If covers or other parts are removed, disassembly labour must be included in labour cost. Parts which are 3D machined must use the rapid prototyping material costs.
S4.9.1.a	**136**	Add; The electronic copy of the BOM must use MS Excel and submitted per Appendix PDA-1 with a CD-ROM or USB “Memory Stick” supplied with the Hard Copy. It should NOT include copies of receipts or any back-up material. The electronic copies of the cost report must be submitted as eBOM with 1 x MS Excel File and 1 x PDF and Excel formats and the Excel cost detail sheets must be submitted under a single file name. Teams may be penalised for lack of report clarity, should the above not be adhered to. Add; For the Australasian event, both hard and soft copies are mandatory and timely submission of both is a key element of the judging process
S4.9.1.b	**136**	Add: It must be a 3 or 4 ring A4 Binder to maintain document integrity
S4.9.3	**136**	Add; The binder containing the cost report should be logically presented with consistency of format and such that it is easy for the judges to trace cost build up from component to system level. Tabs should be clearly labelled for each system and section. The information should be readily located and flow from component to sub-system to system level. Teams should check accuracy and consistency of the information and cost summaries in the report prior to its submission, preferably by team members who have not worked on the report. Clarity is important. Adequate font size and colours should ensure good contrast between font colour and background. Light shades for background colours is best. Repeating the system totals sheet at the start of each section and printing on only one side of a page increases clarity and assists judging, albeit while making a thicker binder.

S4.10.1	**137**	**BOM For Electric Vehicles** The US Appendix S-3 must be used for IC cars. Due to the unique configuration of some systems in EV cars, Electric Vehicles should instead use the Organised List of Systems and Assemblies per Appendix EV-3 available on the SAE-A website at http://www.saea.com.au/page-18488
S4.13	**138** **139**	**Make versus Buy** Add; **S4.13.6**: Wheels: Within the cost tables there is no entry for team-made wheel rims (shells) fabricated from metal. Accordingly, to ensure rational cost data, if wheel rims are team made (Al; Mg; Steel) the reported cost must be at least equal to or greater than the lowest cost "bought" rims (or total wheel if single piece) of equivalent type/design to the team made pieces. This clause does not apply to student made wheel centres.
S4.16	**140**	**Late Submission of Cost Report** Correct error in US Rules: Reference should be to Clause A8.4.3; not A8.4.2.
S4.17	**140**	**Addendum:** Teams are reminded that any Cost Addendum must be submitted at the time of registration and its receipt will be recorded by the registering officials. This rule clause will be strictly enforced at the 2018 SAE-A event.
S6.2.5	**146**	Add new clause: 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.
S6.2.6	**146**	Add new clause: 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 (i.e. no CAE or computer graphics).
S6.5.2	**146**	Delete US words. Add: The Design Report file must be named as follows: carnumber_schoolname_Design.pdf using the SAE-A assigned car number and the complete school name, e.g. 001_University of SAE_Design.pdf
S6.5.5	**146**	Add New clause: The design report 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: HandBrake or Apple iTunes for video transcoding.
S6.5.6	**146**	Add New clause: Similar to the Design Report, the Design video file must be named as follows: carnumber_schoolname_Design.mp4 using the SAE-A assigned car number and the complete school name, e.g. 001_University of SAE_Design.mp4
S6.5.7	**146**	Add New clause: An identical high-definition version of the video may optionally be uploaded to YouTube, unlisted, with the URL supplied when submitting the Google Form per Appendix PDA-1.

S6.9	**147**	**Penalty for Unsatisfactory Submissions** Delete; US wording Add; At the discretion of the judges, teams that submit a design report or a design spec sheet, which is deemed to be unsatisfactory, will have their points score reduced.
S6.11.5	**147**	**Design judging** Delete; The Design Judging Score Sheet is available at ww.fsaeonline.com/go/downloads. Add; The Design Event Score Sheet is available on line at http://saea.com.au/page-18488
Appendix S-7	**157**	**Design Judging** Delete; US Wording Add; The Design Event Score Sheet is posted on line at http://saea.com.au/page-18488
D1.3	**158**	**Added Clause; 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). Contravention of this clause will result in zero score for the event concerned. Vehicle condition monitoring and communication with the driver is permitted.
D3.8.2	**159** **160**	**Tyre Changing during the Endurance Event** Add; New clause, **D.3.8.2.(f)** 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 disqualified from that heat. 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.
Article 4 **D8.2**	**160** **167**	**Driver Limitations** A minimum of 4 drivers must be used. The Australasian Event will consist of a single heat for the Endurance and Fuel Efficiency event.
D7.2.1	**165**	**Autocross Course Specifications and Speeds** Add; The track will generally be similar to the US rules but teams will be advised of the final layout, the distance to be run for a heat and direction of travel following registration. Teams will have the opportunity to walk the track with the Clerk of Course on the Friday of the event. Min. track width will be 3.5m
D8.6.1 **D8.6.2**	**167** **168**	**Endurance & Efficiency** Add; The track will generally be similar to the US rules but teams will be advised of the final layout and direction of travel following registration. Teams will have the opportunity to walk the track with the Clerk of Course on the Friday of the event. Min. track width will be 3.5m

D8.7	**168**	**Endurance general Procedure** Per US Rules. Add; **D8.7.8** The number of vehicles on the track simultaneously will be at the discretion of the clerk of the course but generally will not exceed 4.
D8.12.9	**170**	**Post Endurance Fuel Refill – IC Cars** Add The officials may selectively shake/vibrate/tilt a vehicle at refuelling following endurance, or in the 'Parc Ferme'. In the event of any change in level, Clause D8.16.1 penalties will be applied.
D8.18	**171**	**Endurance Penalties.** **Add;** 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.
D8.22.1	**173**	**Efficiency Scoring Formula** To equate with Australian rather than European electricity grid production emissions the following changes are made: Delete; Electric – 0.65 kg of CO_2 per kWh Add; Electric – 0.85 kg of CO_2 per kWh
D9.3 **D9.4**	**175** **176**	**Information and Command 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.
D10.7	**177**	**Trash Clean Up** **Add Clause 10.7.3:** Any cost incurred to SAE-A due to removal of rubbish, additional cleaning or damage caused to site or pit must be paid for by the offending team for payment.
Article 11 **D11.10**	**177** **178**	**General Rules** Add; The following general clarification clause is added to cover all dynamic events regarding the status of the vehicle: **Add: 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 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.**

Article 12	**178/9**	**General Pit Rules** 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. 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. **Add Clause D12.6 - 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. **Add Clause D12.7 – Fluid Containers** No open vehicle fluid containers are allowed in the pit area.

APPENDIX PDA - 1

Action Deadlines for 2018 Formula SAE Australasia

All submissions must be received at the SAE-A Office by 5:00 PM (Melbourne local time) on the defined date. Note that due to time zone differences and postage times, teams may need to submit ahead of this time. Early submission of all items is highly recommended.
The US Rules for late receipt apply, except where otherwise noted earlier in this Addendum.
Forms are located at https://www.fsaeonline.com/cdsweb/gen/DocumentResources.aspx, else the format required will be provided in the Google Form below at least one (1) month prior to the due date.

All electronic submissions are to be uploaded to the appropriate section of the Google Form at https://goo.gl/forms/C6NBNMVCj3qQYswU2 by the Team Leader, using a University or official team email address. Team Leader email addresses must be unique for Universities with multiple entries.

- Hint: when prompted to sign in, select **More options → Create account → I prefer to use my current email address**.

Acknowledgement of receipt will be provided by the Google Forms site. Use the edit link in this email to submit subsequent documents.
Submissions must adhere to standard naming and file format to be uploaded to the Google Form:

- Car No_ University Name_ses.xls/IAD.pdf/spec.XLS/Design.pdf/Design.mp4/CR_BOM.xls/ CR_Supplement.pdf/etc.

All post (hard copy) submissions are to be sent to:
SAE-Australasia
PO Box 103
Werribee, Victoria 3030
Australia

Date	Milestone/Deadline	Submission Method	Vehicle Type
8 Apr	Registration Opens for all teams. Registration & payment may be submitted	-	EV & IC
27 Apr	Business Logic Case deadline	Google Form	EV & IC
18 May	Electronic Throttle Control (ETC) Notice of Intent to use deadline	Google Form	IC
6 Jul	Team and student entry fees deadline (Australian and New Zealand teams)	-	EV & IC
3 Aug	Team and student entry fees deadline (International teams)	-	EV & IC
7 Sep	Electrical systems officer and electrical systems advisor forms deadline	Google Form	EV
7 Sep	ESF & FMEA deadline	Google Form	EV
14 Sep	ESF & FMEA deadline	Post	EV
14 Sep	Electronic Throttle Control FMEA deadline	Google Form	IC
21 Sep	Structural equivalency form deadline	Google Form	EV & IC
28 Sep	Impact attenuator data deadline	Google Form	EV & IC
5 Oct	Design report, specification sheet and video deadline	Google Form	EV & IC
12 Oct	Cost report deadline	Google Form	EV & IC
19 Oct	Cost report deadline	Post	EV & IC
26 Oct	Final team member list deadline	Google Form	EV & IC
26 Oct	CAMS license application form deadline	Post	EV & IC
2 Nov	Declaration of planned hazardous materials and MSDS deadline	Google Form	EV & IC
3 Dec	Tech Inspection Check List including electronic throttle control deadline	Google Form	EV & IC
3 Dec	Electrical Inspection Check List deadline	Google Form	EV
6 Dec	Declaration of final hazardous materials and MSDS deadline	Hand Deliver at Site Registration	EV & IC
6-9 Dec	Formula SAE-Australasia Competition	-	EV & IC

All Enquiries relating to the Rules are to be submitted via the Google form at this link: http://www.saea.com.au/fsaerulesenquiries. All other general enquiries are to be sent to the SAE-A Office at info@sae-a.com.au. Address Rules Enquiries to “SAE-A Rules Committee” and Cost Enquiries to “SAE-A Cost Committee”.