FORMULA SAE & FORMULA STUDENT
TECHNICAL INSPECTION/SCRUTINEERING

PART 1
DRIVER’S EQUIPMENT
&
EXTERIOR GENERAL

by

Suzanne and Michael Royce
Albion Associates, LLC
with material from
Jeff Lovell
T14 Driver’s Equipment

Driver’s Equipment

• The following equipment must be worn by the driver anytime he or she is in the cockpit with the engine running:

T14.11 Driver’s Equipment Condition

• All driving apparel covered by Article T14 must be in good condition. Specifically, driving apparel must not have any tears, rips, open seams, areas of significant wear or abrasion or stains which might compromise its fire resistant performance.
T14.2 Helmets

Helmet

A well-fitting, closed face helmet complying with:
- SFI 31.1/2005
- FIA 8860-2204, FIA 8860-2010, FIA 8858-2010 or FIA 8859-2015
- British Standards Institution BS 6658-85 type A/FR rating (Types A & B are not accepted).

And labeled as such.

Open faced or off-road/moto-cross helmets are not approved.

Note: Snell M and K helmets only approved at FS with special permission. See event supps.
Helmets - cont’d

ANNEXE C / APPENDIX C

MARQUAGE
MARKING

FIA Standard 8860-2004
Manufacturer: Helmet Inc
Model: ysomus
Size: 56

Taille minimum: 64x20 mm
Police de caractère: Arial Gras - taille: 2.5 mm
Logo FIA Sport: 17x18.5 mm (fichier image disponible sur demande)

Minimum dimensions 64x20 mm
Font: Arial bold size 2.5 mm
FIA Sport logo size 17x18.5 mm (image file available on request)

Figure 6. Positionnement de l’étiquette FIA sur le casque (sur l’arrière et en bas)
Figure 6. Location of the FIA label on the helmet (at the bottom back of the helmet)
T14.5 Driver’s Suits

A fire resistant one piece suit, made from a minimum of two (2) layers, that covers the body from the neck down to the ankles and the wrists.

The suit must be in good condition, i.e. it must have no tears or open seams, or oil stains that could compromise its fire resistant capability.

The suit must be certified to one of the following standards and be labeled as such:

- SFI 3-2A/5 (or higher)
- FIA 8856-1986
- FIA 8856-2000

Presenter’s Note: SFI 3-2A/1 (single layer) suits are no longer acceptable for FSAE or FS even with FR underwear. They are still OK for FH with FR underwear.
T14.3-10 Driver’s Equipment

T14.3 Balaclava
• A balaclava which covers the driver’s head, hair and neck, made from acceptable fire resistant material as defined in T14.12, or a full helmet skirt of acceptable fire resistant material. The balaclava requirement applies to drivers of either gender, with any hair length. (Was “Applies to ALL drivers”.)

T14.4 Eye Protection
• An impact resistant helmet face shield, made from approved impact resistant materials. The face shield supplied with approved helmets (See T14.2 above) meets this requirement. (No goggles.)

T14.7 Socks
• Fire resistant socks made from acceptable fire resistant material as defined in T14.12, below, that cover the bare skin between the driver’s suit and the boots or shoes.

Note: Socks must be Nomex or equivalent. Cotton or wool no longer acceptable.

No “socklets”, i.e. no bare skin!
T14.8 Shoes
- Fire resistant shoes made from acceptable fire resistant material. The shoes must be certified to the standard and labeled as such.
  - SFI 3.3
  - FIA 8856-2000

T14.9 Gloves
- Fire resistant gloves made from made from acceptable fire resistant material as defined in T14.12.
- Gloves of all leather construction or fire resistant gloves constructed using leather palms with no insulating fire resisting material underneath are not acceptable.
T14.10 Arm Restraints

- Arm restraints are required and must be worn such that the driver can release them and exit the vehicle unassisted regardless of the vehicle’s position. **Arm restraints must be commercially manufactured.**

Note: Arm restraints certified to SFI standard 3.3 and labeled as such meet this requirement, although certification is not mandatory.
Driver’s Equipment - cont’d

T14.6 Underclothing
• **It is strongly recommended** that all competitors wear fire resistant underwear (long pants and long sleeve t-shirt) under their approved driving suit. This fire resistant underwear should be made from acceptable fire resistant material as listed in T14.12 and should cover the driver’s body completely from neck down to ankles and wrists.

Note: If you do not wear fire resistant underwear it is strongly recommended that you wear cotton underwear (t-shirt and long underpants) under your approved driving suit.

T14.12 Fire Resistant Material
• For the purpose of this section some, but not all, of the approved fire resistant materials are: Carbon X, Indura, Nomex, Polybenzimidazole (commonly known as PBI) and Proban.

T14.13 Synthetic Material – Prohibition
• T-shirts, socks or other undergarments (not to be confused with fire resistant underwear) made from nylon or any other synthetic material which will melt when exposed to high heat are prohibited.
T14.14 Fire Extinguishers

Each team must have a minimum of two (2) 2 lb dry chemical/dry powder fire extinguishers.

The following are the minimum ratings, any of which are acceptable at any Formula SAE Series event:

- USA, Canada & Brazil: 10BC or 1A 10BC
- UK, Italy & Europe: 34B or 5A 34B
- Australia: 20BE or 1A 10BE

Extinguishers of larger capacity (higher numerical ratings) are acceptable.

All extinguishers must be equipped with a manufacturer installed pressure/charge gauge.

Both extinguishers are to be presented at Tech Inspection.

**Note:** Aqueous Film Forming Foam (AFFF) and Halon extinguishers and systems are prohibited at Formula SAE or Formula Student competitions.
D12.2 Push Bar

Push Bar

Each car must have a removable device that attaches to the rear of the car that allows two (2) people, standing erect behind the vehicle, to push the car around the event site.

This device must also be capable of decelerating, i.e. slowing and stopping the forward motion of the vehicle and pulling it rearwards.

It must be presented with the car at Technical Inspection.
T6.6 Jacking Point

Jacking Point

• A jacking point, which is capable of supporting the car’s weight and of engaging the organizers’ Quick jacks, must be provided at the very rear of the car.

• The jacking point is required to be:
  a. Visible to a person standing 1 meter (3 feet) behind the car.
  b. Painted orange.
  c. Oriented horizontally and perpendicular to the centerline of the car
  d. Made from round, 25 – 29 mm (1 – 1 1/8 inch) O.D. aluminum or steel tube
  e. A minimum of 300 mm (12 inches) long
  f. Exposed around the lower 180 degrees of its circumference over a minimum length of 280 mm (11 in)
  g. The height of the tube is required to be such that:
     - There is a minimum of 75 mm (3 in) clearance from the bottom of the tube to the ground measured at tech inspection.
     - With the bottom of the tube 200 mm (7.9 in) above ground, the wheels do not touch the ground when they are in full rebound.
  h. Access from the rear of the tube must be unobstructed for at least 300mm of its length.

Presenter’s Note: This last note is because of the new, long (12 ins behind rear tires) undertrays.
T6.6 Use ‘Quick Jack’ in Tech

T6.6 Jacking Point:
A Quick Jack will be present in the Tech garage- try to use it to lift the rear wheels off the ground, if concerned about the jacking point.
T13.1 Car Numbers

Car numbers must appear on the vehicle as follows:

Locations: In three (3) locations: the front and both sides;

a. **Height:** At least 15.24 cm (6 inch) high;

b. Font: **Block numbers** (i.e. sans-serif characters). **Italic, outline, serif, shadow, or cursive numbers are prohibited.**

c. **Stroke width and Spacing** between Numbers: At least 2.0 cm (3/4 inch).

d. Color: Either **white numbers on a black background or black numbers on a white background.** No other color combinations will be approved. (Except if required by the event supps for electrics, etc.)

e. Background shape: The number background must be one of the following: **round, oval, square or rectangular.** There must be at least 2.5 cm (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,** e.g. wheels, side pods, exhaust system, etc.
Car Numbers - OK
Car Numbers - Not OK
Each car must clearly display the school name (or initials – if unique and generally recognized) in Roman characters at least 5.08cm, (2 inch) high on both sides of the vehicle.

The characters must be placed on a high contrast background in an easily visible location.

The school name may also appear in non-roman characters, but the roman character version must be uppermost on the sides.
The SAE logo must be displayed on the front and/or both sides of the vehicle in a prominent location. SAE logo stickers will be provided to the teams on site.
Technical inspection stickers will be placed on the upper nose of the vehicle. Cars must have a clear and unobstructed area at least 25.4cm wide x 20.3cm high (10” x 8”) on the upper front surface of the nose along the vehicle centerline.

Vehicles that are being entered into multiple competitions in the FSAE series must allow sufficient space along the nose centerline for all inspection stickers.
T12 Transponders

Transponders – North American FSAE Competitions

Each team is responsible for having a functional, properly mounted transponder of the specified type on their vehicle. Vehicles without a specified transponder will not be allowed to compete in any event for which a transponder is used for timing and scoring.

Transponder Requirement

All vehicles must be equipped with at least one MYLAPS Car/Bike Rechargeable or MYLAPS Car/Bike Direct Power transponder.

Note:

Except for their name, AMB TranX260 transponders are identical to MYLAPS Car/Bike Transponders and fully comply with this rule. If you own a functional AMB TranX260 it does not need to be replaced. The MX (orange) or X2 MX transponders used at the Baja SAE events will not work with the FSAE timing equipment.
Transponders - cont’d

T12.3 Transponder mounting

The transponder mounting requirements are:

a. **Orientation** – The transponder must be mounted vertically and orientated so the number can be read “right-side up”.

b. **Location** – The transponder must be mounted on the driver’s right side of the car forward of the front roll hoop. The transponder must be no more than 60 cm (24 in) above the track.

c. **Obstructions** – There must be an open, unobstructed line between the antenna on the bottom of the transponder and the ground. **Metal and carbon fiber may interrupt the transponder signal.** The signal will normally transmit through fiberglass and plastic. If the signal will be obstructed by metal or carbon fiber, a 10.2 cm (4 in) diameter opening can be cut, the transponder mounted flush with the opening, and the opening covered with a material transparent to the signal.

d. **Protection** – Mount the transponder where it will be protected from obstacles.
T3.23 Front Bodywork

• Sharp edges on the forward facing bodywork or other protruding components are prohibited.

• All forward facing edges on the bodywork that could impact people, e.g. the nose, must have forward facing radii of at least 38 mm (1.5 inches).

• This minimum radius must extend to at least 45 degrees relative to the forward direction, along the top, sides and bottom of all affected edges.

Presenter’s note: Typically this requirement does NOT apply to the leading edges of any side pods because they are “behind” the front tyres.
All forward facing edges on the bodywork that could impact people, e.g. the nose, must have forward facing radii of at least 38 mm (1.5 inches).

This minimum radius must extend to at least 45 degrees relative to the forward direction, along the top, sides and bottom of all affected edges.
2014 ‘Tennis-ball test’ goes away, new larger keep out areas. Nothing, including wings, can be in these areas, which extend vertically, infinitely.

i.e. wings, end plates, or bodywork can never be vertically above the tire.
T9: Aero Device Locations

New restrictions on wing positions, diagrams below. See rules or tech sheet for dimensions.

No aero devices in colored areas! (Includes Open Wheel keep outs from previous slide)
T9: Aero Device Locations

New restrictions on wing positions, diagrams below. See rules or tech sheet for dimensions.

No undertrays behind rear tire

No wings over rear tire
T9.5.1: Minimum Radii of Edges of Aerodynamic Devices

Only *forward facing* edges need the round edge radius (5mm for horizontal edges, 3mm for vertical edges).

- **Trailing edges**: no requirements
- **Horizontal, forward-facing**: (min radius 5mm)
- **Vertical, forward-facing**: (min radius 3mm)
T9.7.1 Aero Device Stability & Strength

• All aerodynamic devices must be designed such that the mounting system provides adequate rigidity in the static condition and such that the aerodynamic devices do not oscillate or move excessively when the vehicle is moving. In Technical Inspection this will be checked by pushing on the aerodynamic devices in any direction and at any point.

NOTE: The following is guidance as to how this rule will be applied but actual conformance will be up to technical inspectors at the respective competitions. The intent is to reduce the likelihood of wings detaching from cars.

1. If any deflection is significant, then a force of approximately 200N may be applied and the resulting deflection should not be more than 25mm and any permanent deflection less than 5mm.

2. If any vehicle on track is observed to have large, uncontrolled movements of aerodynamic devices, then officials may Black Flag the car for inspection and the car may be excluded from that run and until any issue identified is rectified.
Wings must not wobble around. If wobbly in Tech, call chief scrutineer over for a formal evaluation.
T9.7.1: Aerodynamic Device Stability

If any deflection is significant, a force of approximately 200N (45-50 lbs.f) can be applied and the resulting deflection should not be more than 25mm and any permanent deflection less than 5mm.

This was a new requirement for 2015, intended to reduce the occurrence of wings coming loose during dynamic events.

Non-structural parts of the wings (end plates, outermost edges) single-finger-type forces can certainly damage the vehicle. But this is not what we are interested in - instead we want to evaluate the robustness of the mounting system between the wing and the frame.

If the wing mounting system seem too flexible, get the chief scrutineer before using the above test.
T14.15 Cameras

- T14.15 Camera Mounts - The mounts for video/photographic cameras must be of a safe and secure design.
  - All camera installations must be approved at Technical Inspection.
  - **Helmets mounted cameras and helmet camera mounts are prohibited.**
  - The body of a camera or recording unit that weighs more than 0.25 kg (9 oz.) must be secured at a minimum of 2 points on different sides of the camera body. If a tether is used to restrain the camera, the tether length must be limited so that the camera cannot contact the driver.

NOTE: most GoPro cameras weigh less than 0.25kg.

Presenter’s comment: Make sure that the helmet is not going to hit the camera mounts (especially those for a GoPro). If the driver rolls the car - the belts WILL stretch.
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