Refuelling Process, Approved Devices & Fuel Cells

Appendix 6

For AASA sanctioned events V1.4 2023

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Background

Risk management principles follow a hierarchy of actions or controls, designed to reduce or eliminate hazards to prevent the risk of injury, or property damage.

Refuelling of race cars, at any time carries a high risk of fire, due to the nature of the activity, and the volatile nature of Petroleum Fuel, combined with multiple potential ignition sources.

Fuel itself is a generally toxic mixture of many chemicals, some of which are known carcinogens. Fuel splashed into the eyes can cause serious, and in some cases permanent eye damage. Avoid breathing fuel vapours, contact with the skin and ingestion.

Risks

Historically, fire occurring during refuelling operation is not common, but has occurred, with the consequences potentially catastrophic, leading to serious injury, even death.

In club level motorsport, endurance events often require race vehicles to be refuelled during the race, and this document sets out to provide guidance to competitors, who are planning on using refuelling devices, at race events.

Pit/Garage Refuelling

Fuel Storage

Competitors need to familiarise themselves with the Supplementary Regulations issued for the event they are competing in, AND all/any venue specific requirements, regarding the safe storage of fuel. This may include maximum amounts.

If maximum storage amounts are not specified elsewhere, the recommended maximum amount allowed to be stores in a pit/garage area, is 60 litres, per competition vehicle.

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Fuel storage containers shall comply with *Australian Standard 1940 – 2004 The storage and handling of flammable and combustible liquids.*

Fire Extinguishers

At all times, competitors must provide one (1) x up to date, tagged and fully functional dry powder fire extinguisher, per competition vehicle. This fire extinguisher MUST be in the pit/garage area, and easily accessible at all times.

The minimum capacity shall be 4.5kg with 9kg fire extinguishers being strongly recommended.

All competitors and crew are to note, Smoking is not permitted in pit lane, the pit lane garages during the meeting.

Methods of Refuelling

For all situations, not involving "In-race" refuelling, the following shall apply.

- Personnel directly involved in the refuelling activity, or within one (1) metre of the refuelling activity shall be attired in accordance with the *AASA; Appendix 4 Apparel Requirements. (*An excerpt of that Appendix is contained at the end of this document)

  ✦ *Neck to wrist to ankle clothing of non-flammable material (e.g. wool, cotton)* ✦ *Fully enclosed footwear with chemical resistant soles*

  ✦ *Fully* enclosed safety goggles. or full-face protective helmet
- It is recommended that all refuelling takes place in the open air, whenever possible.
- For all refuelling, funnels are not recommended; competitors are strongly encouraged to use a manual pump system which has a low risk of spillage.
- Electric operated pumps are not permitted to be used in any circumstances.
- If fuel is being tipped directly from fuel drums/jerry cans into the fuel tank, using a funnel, personnel are reminded to act preventing accidental spills splashing onto hot exhausts, or hot engines.

In Race Refuelling

Fuel Storage

Competitors need to familiarise themselves with the Supplementary Regulations issued for the event they are competing in, AND all/any venue specific requirements, regarding the safe storage of fuel. This may include maximum amounts.

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In the event that maximum storage amounts are not specified elsewhere, the maximum amount allowed to be stored in a pit/garage area, is *100 litres*, per competition vehicle.

Fuel storage containers shall comply with *Australian Standard 1940 – 2004 The storage and handling of flammable and combustible liquids.*

This amount is in addition to any fuel contained within a gravity fed refuelling container. The maximum fuel such gravity fed refuelling container is 200L.

Fire Extinguishers

At all times, competitors must provide one (1) x up to date, tagged and fully functional dry powder fire extinguisher, per competition vehicle. This fire extinguisher MUST be in the pit/garage area, and easily accessible at all times.

The minimum capacity shall be 4.5kg with 9kg fire extinguishers being strongly recommended.

If during competition, this fire extinguisher is discharged, competitors will need to have another charged extinguisher at their disposal, in order to continue to compete.

For events with in-race refuelling, it is strongly recommended that competitors have two (2) x up to date, tagged and fully functional dry powder fire extinguishers.

Apparel for Refuelling Personnel

All personnel involved in the refuelling activity, or within one (1) metre of the refuelling activity MUST be attired in the following.

- Neck to wrist to ankle clothing of non-flammable material (e.g. wool, cotton) (approved Drivers race suits are strongly recommended)
- Non-flammable Balaclava, and Gloves
- Fully enclosed footwear with chemical resistant soles
- Fully enclosed safety goggles must be worn, with a full-face protective helmet, strongly recommended.

Refuelling Personnel

The following are the definitions, and roles of personnel involved in the 'In-Race' refuelling process.

Vehicle Re-fueller

During the re-fuelling of the car, the vehicle Re-fueller must only handle and operate the refuelling hose for the duration of the Refuelling operation.

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Fuel Rig Emergency Cut-Off Attendant (x1) – Dry-Break or Gravity Fed Tower Refuelling

During the refuelling of the car, the Fuel Rig Emergency Cut-Off Attendant must hold the re-fuelling rig 'dead-man' valve open during the re-fuelling operations and MUST NOT perform any other duties until the refuelling is completed.

OR

Fuel Hand Pump Operator – Hand Pump Refuelling

During the refuelling of the car, the Fuel Hand Pump Operator is to operate the hand pump under the direction of the Vehicle Re-fueller and must not participate in any other activities other than the duties of Fuel Hand Pump Operator.

Fire Attendant

During the re-fuelling of the vehicle, the Fire Attendant must be ready and located adjacent to the refuelling rig (usually behind the vehicle) with a working fire extinguisher (detailed elsewhere)

Where a team elects not to switch off the engine during refuelling operations, a second Fire Attendant MUST be positioned adjacent to the engine.

The Fire Attendant(s) must not participate in any activities other than the duties of a Fire Attendant during the entire refuelling activity.

Approved Refuelling Devices

As with all parts of this document, safety standards must be of the highest level.

For refuelling devices, it is expected that two methods of controlling fuel flow are fitted to the device.

Competitors are reminded that all refuelling devices MUST be in safe working order (no fuel leaks, all fittings tightened & sealed)

Refuelling devices will be inspected by Scrutineers or Race Officials.

The following list, and descriptions are the only approved manual refuelling devices allowed for use at AASA Sanctioned circuit race events.

1. Gravity fed refuelling tower (not exceeding 200L) with 'Siamese' Dry-break couplings, and a 'deadman', valve at the point of supply.

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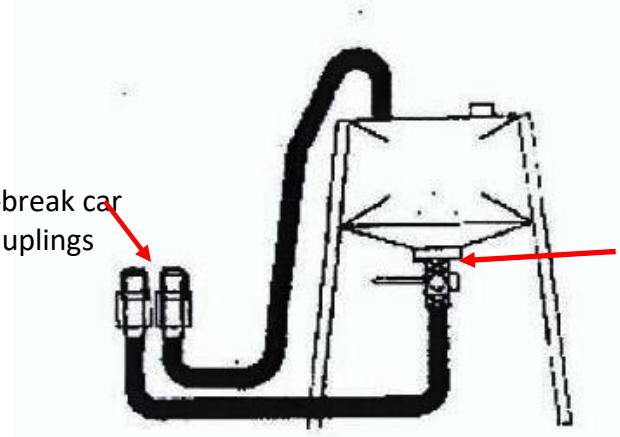
2. Gravity fed refuelling tower (not exceeding 200L) with a trigger nozzle fitted to the hose end, and a 'deadman', valve at the point of supply.
3. A portable fuel drum (not exceeding 60L) fitted with a hand-operated pump, and a trigger nozzle fitted to the hose end.

TYPE ONE:

Gravity fed refuelling tower, not exceeding 200L, with 'Siamese' Dry-break couplings, and a 'deadman' valve at the point of supply.

'Siamese' Dry-break car connection couplings



Deadman fuel shutoff valve. This MUST be loaded/selfclosing so it self-returns to the closed position.

Competitors must ensure this refuelling rig arrangement is properly secured to ensure it cannot be fall, or be dragged over, in the event of an incident. This rig is not to be moved after it has been filled.

All parts of the rig (tank and stand) must remain totally within the pit garage. No part of the storage container, except for any venting system shall be at a height above 2.00m from the garage/pit bay floor.

The delivery hose may to be moved into pit lane only after the competition vehicle has come to a complete stop.

The delivery hose MUST be secured in the garage, prior to the car leaving the pit bay.

TYPE TWO:

Gravity fed refuelling tower, not exceeding 200L, with a trigger nozzle fitted to the hose end, and a 'deadman', valve at the point of supply.

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Deadman fuel shutoff valve.
This MUST be spring-loaded/self-closing so it

Competitors must ensure this refuelling rig arrangement is properly secured to ensure it cannot be fall, or be dragged over, in the event of an incident. This rig is not to be moved after it has been filled. No part of the storage container, except for any venting system shall be at a height above 2.00m from the garage/pit bay floor.

When using a drum based system, competitors must ensure that the drum is properly secured to the stand/trolley.

All parts of the rig, (tank and stand) must remain totally within the pit garage. The delivery hose may be moved into pit lane only after the competition vehicle has come to a complete stop.

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The delivery hose MUST be secured in the garage, prior to the car leaving the pit bay.

TYPE THREE:

A portable fuel drum not exceeding 60L fitted with a hand operated pump, and a trigger nozzle fitted to the hose end.

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Competitors who choose to use a trolley mounted drum & pump device are reminded that the following points must be complied with.

- Approved Clear Fuel hose can be used, so fuel-flow can be observed, with dedicated fuel hose being strongly recommended (e.g. Maximus dedicated fuel hose part ref # RWPS09-025)

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- A squeeze to operate trigger nozzle MUST be fitted to the delivery end of the hose (e.g. • MacNaught Rapidflo)
- The drum MUST be secured to the trolley.

The trolley assembly MUST remain totally within the pit garage, until the competition vehicle has come to a complete stop. During refuelling, the trolley assembly is permitted to be moved into pit lane, but must be returned to the garage, prior to the car leaving the pit bay.

*Excerpt from AASA Appendix 4 *'Apparel Requirements'*

Untimed Pit/Service Area re-fuelling operations

Refuelling an automobile under competition conditions introduces time pressures to the activity. This consequently increases exposure to hazards such as chemical contact from spills/overflows, and exposure fire/explosion from resulting fuel contact with very hot components.

Pressurised refuelling is defined as occurring whenever refuelling is conducted with the fuel in any part of the refuelling system at any time subjected to a pressure equivalent to a head of 600mm or more. In the case of pressurised refuelling, all those involved in the refuelling activity and any persons within one metre of the refuelling or vent location must be attired as follows:

- Overalls to SFI 3.2A Grade 5 (min.), or equivalent international standard
- Gloves to SFI 3.3 Grade 5 (min.), or equivalent international standard
- Shoes/boots, socks, balaclavas (hoods) to SFI 3.3, or equivalent international standard
- Fully enclosed safety goggles, or protective helmet with full-face shielding.
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Refuelling operations that utilise a "forecourt style" 19mm unleaded nozzle with an automatic cut-off shall not be regarded as pressurised refuelling. Where other than pressurised refuelling is conducted, all those involved in the refuelling activity and any persons within one metre of the refuelling or vent location must be attired as follows:

- Neck to wrist to ankle clothing of non-flammable material (e.g. wool, cotton)
- Fully enclosed footwear with chemical resistant soles
- Fully enclosed safety goggles. or full-face protective helmet

Retesting of Fuel Cells

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Fuel cells are required to be re-inspected 5 years after the date of manufacture and every 2 years thereafter with a maximum compliance life of 15 years from date of manufacture.

Fuel cells should only be inspected by approved testing facilities with proof of inspection to be available at vehicle scrutineering.

Re-inspection details should be recorded in the vehicle's passport.

Damage fuel cells are non-compliant and should not be repaired and will not be accepted at scrutineering.

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