



FEDERATION INTERNATIONALE DE L'AUTOMOBILE

**Guide and installation specification for Hybrid &
Hybrid Pro devices in racing competition**

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Foreword

A Frontal Head Restraint (FHR) restrains the driver's head relative to his torso during a frontal or angled-frontal impact thereby, reducing the loads to the head and neck.

There are different types of FHR systems approved, the HYBRID and HYBRID PRO being two of them.

This document aims to give some basic guidelines on the aspects to take into account when selecting and using a HYBRID or HYBRID PRO device for racing competitions. These guidelines apply to HYBRID and HYBRID PRO approved according to FIA Standard 8858-2010 that are included in Technical List n°29 available in the FIA web site www.fia.com under the homologations section.

1. Hybrid or Hybrid Pro Selection

When choosing a Hybrid or Hybrid Pro model type and sizing needs to be considered. The Hybrid has a longer rear tail than the Hybrid Pro and two straps that connect to the safety harness buckle called Seat Belt Anchoring System (SAS). The Hybrid Pro does not include the SAS.

The seating position angle does not influence the type of Hybrid or Hybrid Pro to select.

Unless specified, when Hybrid is mentioned in this document, it refers to both HYBRID devices and HYBRID PRO devices.

1.1. Hybrid sizing

Hybrid devices are sized by the Hybrid-harness that attaches the device to the wearer. The rigid part of the device is the same for sizes Extra Small to XXX Large. The Hybrid-harness of the device is sized by measuring the wearer chest contour as shown in Figure 1.

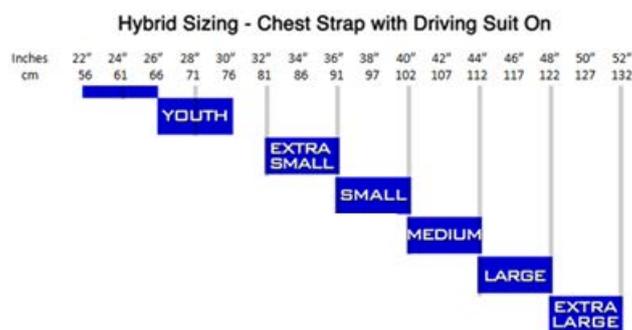


Figure 1 Sizing according to chest contour

1.2. Hybrid wings or tabs

Hybrid devices have small wings or tabs at the upper part of the shoulder belt bearing surface as shown in Figure 2, in order to reduce the lateral movement of the shoulder belts and retain the belts on the device.

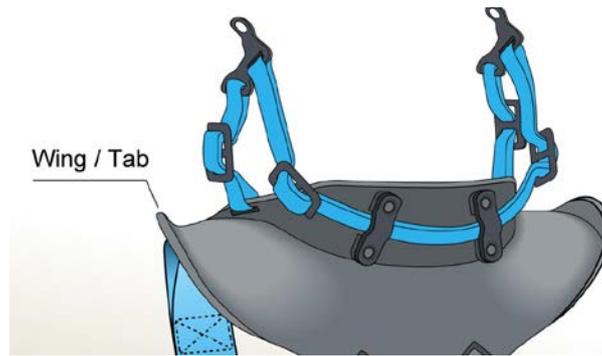


Figure 2 Example of wing on and Hybrid Pro device

2. Preparation of a Hybrid

The body of the Hybrid device must never be modified but there are some aspects that can be taken into account to prepare the Hybrid or Hybrid Pro.

2.1. Friction rubber

The upper surface of some Hybrid devices is covered in a high friction rubber to grip the lower surface of the shoulder straps. On these devices, drivers must not remove the friction material. The condition of the rubber surface should be monitored – no breakage, ripping, tears or other damage is acceptable. In case of repair, it shall be done strictly in accordance with the manufacturer's instructions. FIA strongly recommends for this operation to be carried out by device's manufacturer.

If the Hybrid is painted (only in conformity with the manufacturer's instructions) it is essential that the rubber is left completely uncovered to ensure that the friction with the shoulder belts is not compromised. Any painted Hybrid shall respect the flame resistance requirement of FIA Standard 8858-2010.

2.2. Padding

The surface of the Hybrid device in contact with the driver's body can be padded for comfort. Any padding used between the driver and the Hybrid must not be more than 15 mm thick when the driver is seated in the car fully equipped with the harness tightened. The padding must be covered by a flameproof material and the padding must not be wider than 8 mm on each side of the Hybrid.

2.3. FHR Tethers length Adjustment

The tether assemblies for a Hybrid need to be adjusted to the individual driver, while seated in racing position with its harnesses tightened.

Hybrid devices have two pairs of FHR tethers as shown in Figure 3.



Figure 3 Identification of a Hybrid device's tethers

The procedure to adjust the tether assemblies in the car is as follows:

- 1) Once seated in racing position with the harnesses tightened,
 - The rigid part of the Hybrid must be sitting on the shoulders between the driver's back and the seat and the shoulder belts should be on the belt bearing surface on the device.
 - The FHR tethers should be pulled up slightly to make sure the device is up against the shoulder belts after the belts are tensioned.
- 2) The rear tethers should adjusted first.
 - The rear tethers can be partially unlaced from the adjustment 3-bars to allow for adjustment of the tethers.
 - The tether should be then attached to the helmet on both sides of the helmet.
 - It is recommended to fit the tethers so that they will allow the wearer forward head movement in the range of 25mm to 50mm, from the wearer's Static or Starting position in the car as indicated in Figure 4. The static position is the position that the wearer is in while driving the race vehicle. The helmet should not be up against the rear headrest, but rather be in the normal driving position. (The chin should be up while doing this maneuver. It is a straight forward motion.)

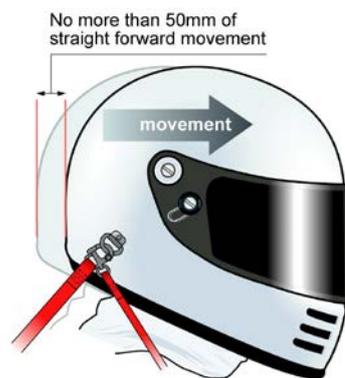


Figure 4 Movement to define the tethers adjustment

- Always adjust the tethers on the right side of the restraint to the same length as the left side of the restraint.
- 3) The front tethers should be adjusted next.

- With the helmet anchor attached to the helmet, the front tether length should be adjusted to a suitable length to be able to rotate the head to the left and right. The wearer should have free movement for at least the first 12mm to 25mm. The movement should be restricted to less than 90° on each side.

The condition of the tethers and clamping brackets and the screws securing them to the back of the Hybrid series should be closely monitored and they should be replaced if any wear is observed.

2.4. Seat Belt Anchoring System (SAS) Straps on Hybrid devices

Hybrid devices have two diagonal straps that run from the bottom of the rigid part of the device, around the wearer to the front of the wearer and attach into the seat belt buckle. These straps are called the Seat Belt Anchoring System (SAS) and they are not present in Hybrid Pro devices. The end fitting of the SAS should be hooked to either to the shoulder straps tongues, the lap strap tongues or the crotch strap tongues. Figure 5 shows some examples of possible assemblies.

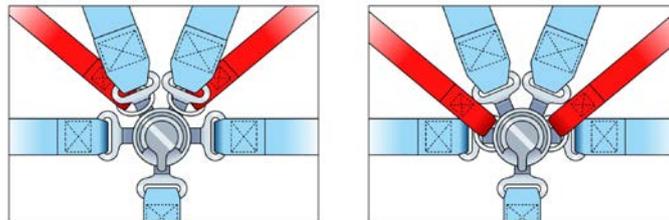


Figure 5 Examples of the SAS assembly into the seat harness buckle

The length of the SAS straps should be adjusted once the seat belt harness and the rest of the Hybrid straps have been buckled and tightened.

3. Helmets to be used with an HYBRID or HYBRID PRO

An FIA approved helmet according to FIA Standards 8858-2002, 8858-2010, 8860-2004, 8860-2010 or 8859-2015 is required. Please refer to FIA Technical Lists nos 33, 41 and 49 for a full list of helmets approved for FHR use (including HANS® use). Helmets with FIA labels 8858-2002 or 8858-2010 are only valid when they also have a Snell sticker. Therefore, only helmets with a valid Snell certification are acceptable.

It is important to take into consideration the following dates:

- Helmets approved in accordance with SA2005 certification will not be valid after **31.12.2018** even if they have an FIA 8858-2002 or 8858-2010 label. Technical List no. 41 details what Snell standard the homologation was based on.
- Helmets approved according to FIA Standard 8860-2004 will not be valid after **31.12.2020**.
- Helmets approved according to FIA Standards 8858-2002 or 8858-2010 will not be valid after **31.12.2023** regardless of what Snell certification they may have.

Hybrid device shall always be used together with the helmet and shall be properly fitted (FHR tether end fittings clipped on the helmet and all device straps buckled and tightened).

Therefore whenever a helmet is not worn, for example on rally liaison sections, the Hybrid shall also be removed.

4. Installation

4.1. Seats

When using a Hybrid with a salon car, safety seats homologated according to FIA Standards 8855-1999 or 8862-2009 must be used.

In these cases, it is important to ensure that the shoulder straps run freely between the seat shoulder slots. It is therefore recommended to centre the belt traps in the slots so they do not touch the edges of the slots

4.2. Harness

The safety belts to be used must be minimum 5 point harnesses homologated to FIA standard 8853/98 or 8853-2016. Drivers must ensure that they remain properly tightened all the time.

Teams shall pay particular attention to the installation of the shoulder straps and the position of the buckle. The buckle position is regulated by Article 253.6.2 to the ISC. See below extract of the related regulation:

Article 253.6 Safety Belts

(...)

The lap straps must fit tightly in the bend between the pelvic crest and the upper thigh. Under no conditions must they be worn over the region of the abdomen.

Some Teams tend to fit bungies on the shoulder belts in order to move them to the side of the seat. However, this also moves the shoulder belt sideways, so that the belt contact area is reduced, adversely affecting the Hybrid Pro series. Do NOT fit bungies.

4.2.1. Harness restrictions

Hybrid devices can be used with harness models that are homologated with the standard shoulder strap width of a minimum of 70mm, as well as with models that are homologated with specific shoulder strap width of a minimum of 44 mm and that are marked "for FHR use only", or "for HANS® use only".

FIA Homologated double shoulder belt systems are not necessary or useful for use with the Hybrid or Hybrid Pro devices.

4.2.2. Position of Adjusters

The length adjustment device of the shoulder belt shall be positioned low on the chest.

4.2.3. Shoulder belt angles – top view

The shoulder belt anchorage points on the car shall be symmetrical about the centre line of the driver's seat. When viewed from above, it is recommended that the angle between the belts be approximately 20°-25° and never out of the 10°-25° range. Belts may touch or even be crossed over each other if necessary as shown in Figure 6.

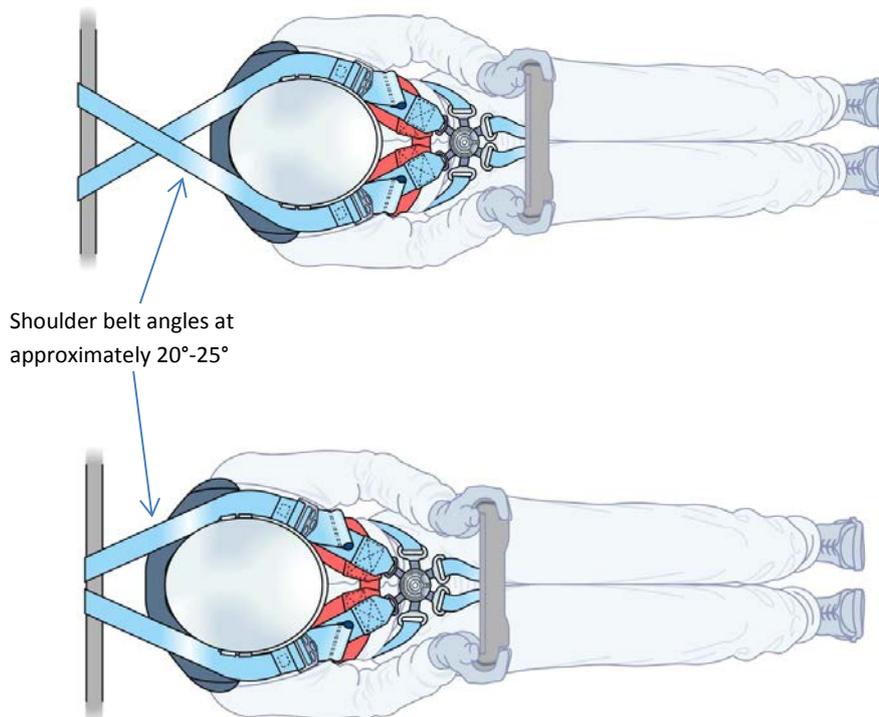


Figure 6 Examples of shoulder belt angles

It is important to make sure that the shoulder straps attachment cannot slide laterally.

4.2.4. Shoulder belt angles – side view

When using a Hybrid or Hybrid pro with a salon car it is recommended that the rear section of the shoulder strap should be horizontal to sloping downwards from the uppermost point of contact with the Hybrid or Hybrid Pro-belt-bearing-surface to the anchorage point on the car. Preferably between 0° to 10° below the horizontal, and up to 20° being acceptable, as showed in Figure 7.

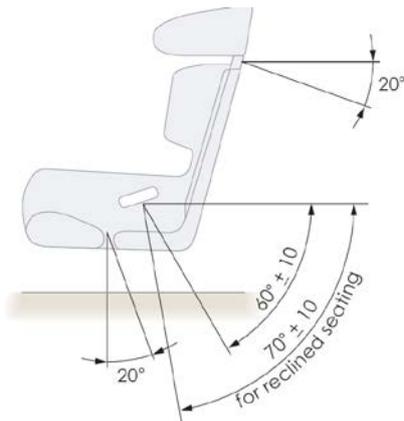


Figure 7 Side view to show recommended belt angles

When using a Hybrid device with a reclined seat (for example in an open cockpit car) it is recommended that the rear section of the shoulder strap is horizontal from the uppermost point of contact with the HANS®-belt-bearing-surface to the anchorage point on the car, preferably a 0° angle, angles between 0° and 10° being acceptable as shown in Figure 8

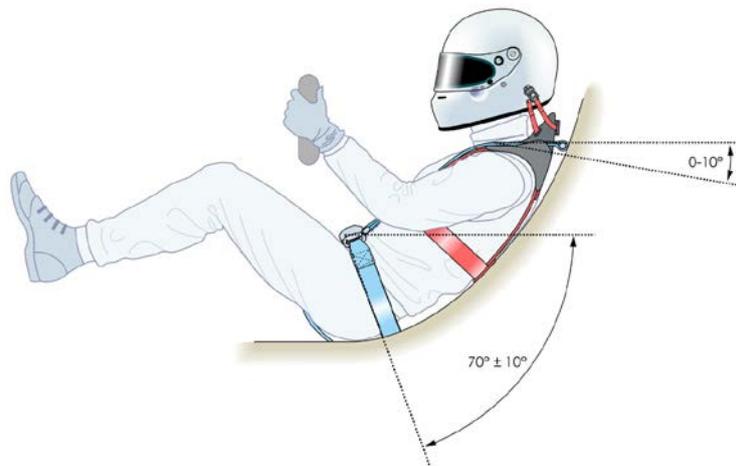


Figure 8 recommended belt angle for open cockpit cars

4.3. Headrests and cockpit surrounds with Hybrid

Since the Hybrid devices have a low collar design, there is no interference expected with the helmet, headrest or cockpit surround.

4.4. Car evacuation with Hybrid

It is essential to practice rapid evacuations from the car with full race equipment fitted (including race attire, steering wheel, radio system and drink system if applicable). This will help to ensure successful emergency evacuation, in the case of an accident.

5. Life of Hybrid

After a heavy impact that involves loading of the Hybrid, it is recommended to replace the helmet and Hybrid device. The respective manufacturers may be able to provide an inspection service to determine whether the helmet or Hybrid device has suffered any damage during less severe impacts.

An accident is considered severe if it is a frontal or frontal with an angle impact with the estimated impact speed over 50kph