FIM REQUIREMENTS FOR CATEGORY 2 AIRBAG 2024

2024 VERSION – (01.03.2024)

The category 2 airbag is allowed in the disciplines and classes not covered by the category 1 (FIM requirements for MotoGP classes) and where the use of airbag is mandatory by the FIM regulations.

All airbags must comply with the requirements detailed below. The following procedures will apply:

- Each different design or model must pass all the tests required into the regulation. Manufacturers will be required to self-certify with the FIM official document that their airbag systems have passed the following requirements.

1. GENERAL

The airbag:

- Shall be triggered without requiring the rider to be connected (tethered) to the motorcycle or to add any device on the motorcycle. If connected to the motorcycle by a mechanical triggering system, the airbag system is accepted if the triggering system performance is compliant with the protocol described in the EN1621-4 standard.
- Once triggered, the inflation time must not be greater than 150 milliseconds.
- Once inflated, the airbag should remain inflated above the minimum operating pressure declared by the manufacturer at least 5 seconds. The pressure should decrease automatically after these 5 seconds and should be below 70% of the operating pressure 30 seconds after triggering. The deflation of the airbag can be automatic (air leakage) or manual (device clearly identified by the manufacturer that should be accessible to the user to be activated by him if needed during riding activity).
- Must be designed in such a way that if accidental deployment occurs, the rider has the ability to keep riding the motorcycle and to not lose the control of the motorcycle. Each manufacturer declares the reliability of its airbag system, based on internal tests implying a real inflation while a rider is riding.
- Must be fitted internally in the race suit or worn under the race suit. It can be worn above the suit if the airbag is abrasion resistant (must pass AA test as request in EN17092- part 3)
- The product size (combination of airbag system and leather suit) must be compatible with the body measurements and also the anthropometry of the rider.
- According to the product's user manual, the rider must ensure that his suit is compatible with the use of the airbag system used.
- The detection system/algorithm/protocol must be adapted for race use application (i.e race mode, etc..).
- The airbag's area of protection must correspond to at least one of the following two options detailed in Section 2.
- The airbag system must be compatible with the use of EN 1621 chest and back protectors, if not included in.
- Passive protectors certified according to EN1621-2 for back protector and EN1621-3 for chest protector, must be used in addition of the airbag system, if not included in.
- The airbag manufacturer should recommend the better position of the passive protectors (if not included) for a more efficient energy absorption depending of the airbag design.
- During deployment, the Airbag must not cause injury to the rider and the other riders.

- The manufacturer can prove the reliability of its detection algorithm by at least 10 representative triggering cases based on video, photo, stunts, testimonies, race data crash acquisition or simulation.
  If video and/or photos are joined they must be synchronized with a timing measurement to show the detection performance. It will allow the examination based on visual control.
  This list of evidences must show 5 low-side and 5 high-side crashes.
  The FIM can ask more details and data for each evidence and can contact also the rider involved.
  The airbag manufacturer must be able to provide the detailed data required by FIM.

2. ASSESSMENT OF IMPACT ENERGY ABSORPTION

a) Minimum dimension of the protection areas

Option 1: The airbag should cover and protect at least the shoulders and the collarbone, as pictured in Figure 1. Even if it is an option, it is highly recommended to protect the full spine.

If the airbag does not cover the shoulders, it must cover at least the collarbone and the ribs (1 to 7 at least, up to 9 is better).

Each manufacturer can extend the protectiveness of their systems

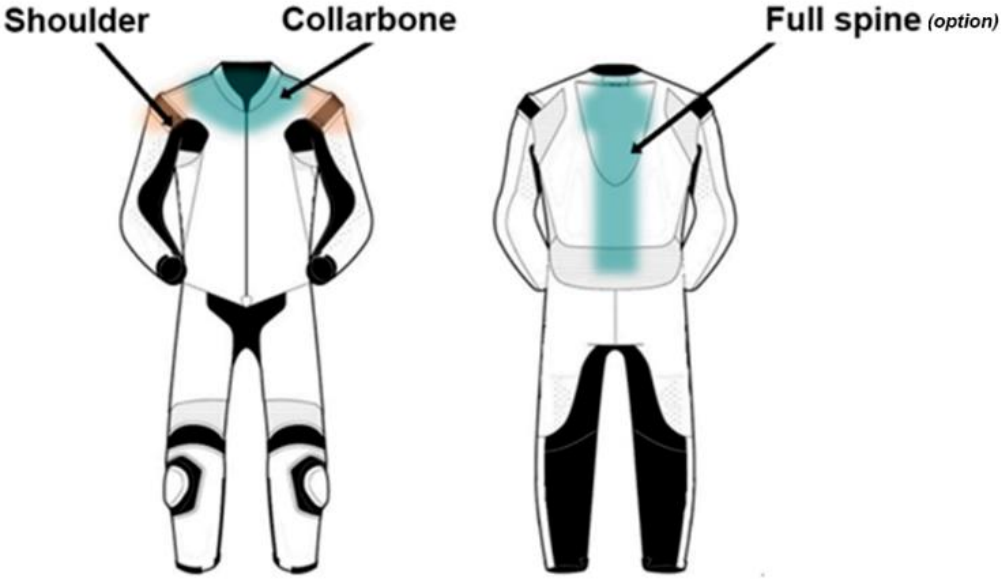

Figure 1.1 — Minimum area of protection with shoulders for Option 1.

Option 2: The airbag should cover and protect at least thorax, spine and collarbone, as pictured in Figure 1.2.

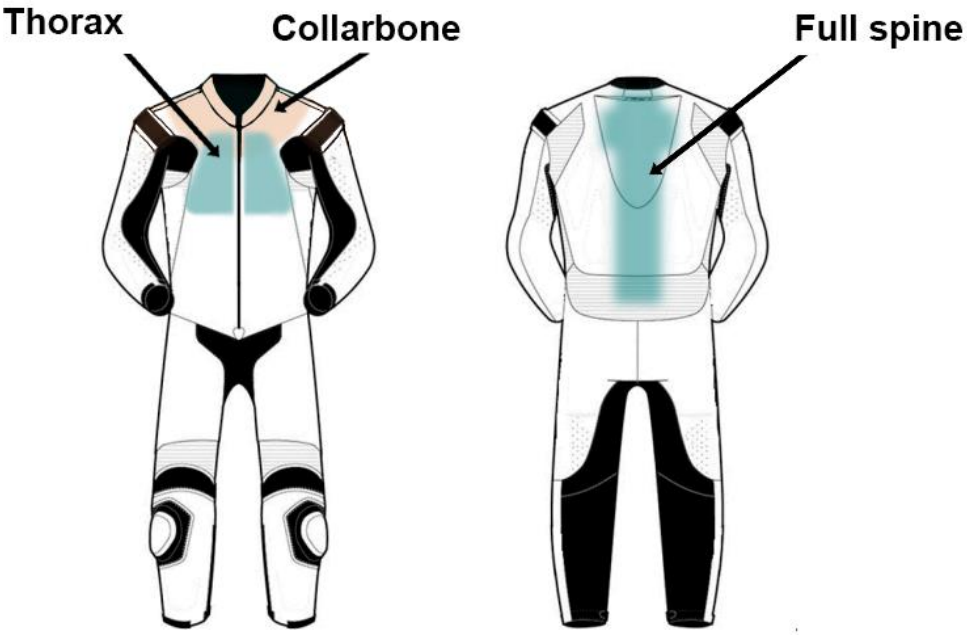

Figure 1.2: Minimum area of protection for Option 2

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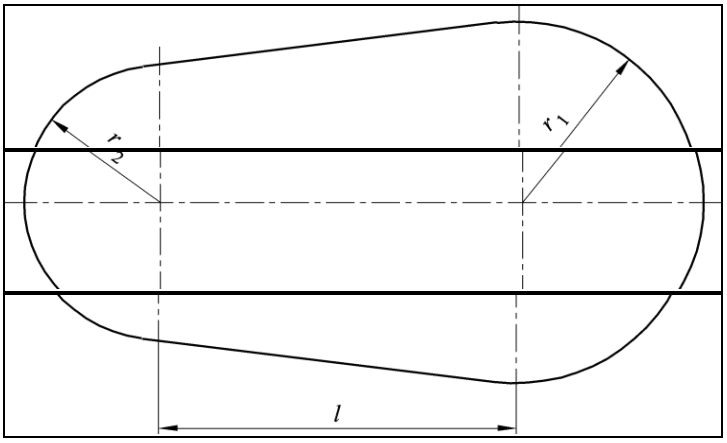
Requirements:

- Areas are defined as a general basis but may vary depending on airbag technologies employed and morphology of the riders.
- Regarding the shoulders, the airbag shall cover at least the area defined in the standard 1621-1, according to Table 1 and Figure 2.
- The airbag associated to the chest protector, shall be designed to improve the impact energy absorption on the areas defined in the standard 1621-3. (A or B template)
- The airbag associated to the back protector, shall be designed to improve the impact energy absorption on the areas defined in the standard 1621-2. At least central back protection is mandatory.
- For EN passive back protector (EN 1621-2) Full or Central back protector is mandatory.
- For areas not covered by an existing standard, dimensions, and shape of the template for the testing method must be supplied by the manufacturer to the FIM Technical Commission (cti@fim.ch).

Table 1 — Dimensions of minimum zone of protection for shoulders

Protector	**Minimum protector area - type A** mm		
	r_1	r_2	l
S	55	32	64

Figure 2 — Shape of the zone of protection for shoulders



b) Impact attenuation requirements

The airbag system must be CE approved (according to the Regulation EU 2016/425) and protect at least the area included in this document.
If the airbag is not CE approved, it must be compliant with the following test process.

An impact test according to the testing method described in the norm EN1621-1, EN1621-2 EN1621-3 if concerned, has to be carried out on the area covered with the following inclusions/modifications.

The full gear (airbag system + leather suit + protectors) has to be tested in the inflated status at the minimum operating pressure declared by the manufacturer.

2 impacts are tested per area: The average peak force of all measurements shall be below 18kN and at least one of the values shall be below 4.5 kN (see Table 2).

Table 2 — Impact attenuation performance

Average peak force	≤ 18 kN

Peak force of at least one value	≤ 4,5 kN

3. ASSESSMENT OF HARD COMPONENTS

Hard components are defined as the electronic unit, airbag inflator and battery (if separated). They must be designed to avoid any risks of additional injury with or without an airbag inflation.

When assembled in the suit, hard components must guarantee impact protection according to EN1621-1, without airbag inflation. The peak force recorded after a single impact shall be below 35 kN (Table 3).

Table 3 — Impact attenuation performance

Single strike	≤ 35 kN

All batteries must pass the following conditions at the time of the impact and for the next 12 hours after the test.

- Do not catch fire or make any sparks
- Do not release any gases or liquid
- Do not change size (other than that caused by the impact test)

The electronic unit must have a minimum 8 hours operational life in between full charges.

4. EQUIPMENT AND TEST METHODS

All impact tests are done with the same equipment and test methods as described in the standards EN1621-1, EN1621-2 and 1621-3.

The values of performance requirement for each part, are given in the above paragraphs.