



## Appendix A

# FIM CCP APDs and Homologation Tests

### Foreword:

An Additional Protective Device (APD) requires an official FIM homologation pursuant to the standards, procedures and specifications for the CCP/FIM Test for APD.

The FIM Homologation is valid only for the tested model/product. New models/products must undergo and obtain a new FIM homologation in accordance with the relevant tests.

If an APD is used permanently or temporarily, it must be erected against a secondary fence on the bends and first part of the two straights only. The secondary fence must be approved by the FIM. When fitting APDs to the safety fence, a gap of approximately 10cm between the APD and the fence is permitted. This is necessary to allow for the natural curvature of the safety fence.

The APD must be solidly connected to the top and, as solidly as possible, to the bottom of the secondary fence or to the ground in order to avoid a possible rising during impact.

The lower part of each APD must be equipped with a kickboard.

If constructed by the means of modules, these shall be solidly attached and a flap, overlapping and connected to the next module in the direction of racing, has to be provided at the end of each module. The same applies for the kick board.

All the materials composing the APD must be fire resistant.

Contingency ADP must be available in order to be able to quickly replace a punctured or damaged unit.

APD manufacturers will be required to ensure that from 01.01.2016 every new APD panel is labelled with its own individual serial number and the year of manufacture. This label should be hard wearing and easily accessible for inspection.



APD manufacturers will notify the FIM in writing or by email whenever major repairs or servicing is carried out to any APD fence. The information shall include the name of the track, details of the work carried out, any replacement panels supplied and any recommendation for future work. The manufacturers should also send to FIM the numbers of APD installed on any tracks.

Any manufacturers of a certified APD can lose its FIM certification if the APD sold/installed is not complying with the "tested/certified original APD. Moreover a CHF 25'000.- penalty would apply.

### **Definitions:**

An APD is a device designed to absorb the kinetic energy of a motorcycle and rider in a controlled manner to reduce the potential for injury.

A flat rigid surface is placed vertically to support the rear of the safety barrier during the impact test in order to simulate the in-track installation. A crash test dummy is constructed with appropriate mass and geometry to represent a rider.

If constructed by the means of modules, the kickboard must overlap the adjacent module by not less than 20cm in the direction of racing. The modules shall be solidly attached and a flap, at the end of each module, must overlap and connect to the adjacent module by not less than 20cm in the direction of racing, extending from kickboard height to above handlebar height.

The motorcycle shall be able to slide tangential to the barrier without nesting. Thus the barrier shall resist penetration and nesting by the handlebars.

The barrier shall resist strongly against punctures due to protruding structures.

The barrier shall be constructed using fire resistant materials in order to resist burning methanol and contact with a hot exhaust system. This can be demonstrated by either material data sheets or physical testing at an approved laboratory.

If the barrier is pneumatic, the manufacturer must be able to certify the correct operating pressure by visual apparatus to the clerk of course at the time of installation.



## **Impact Performance:**

Three performance levels are prescribed; Type-A“plus+”, Type-A and Type-B. The test impact velocities at 90° for

Type-A“plus+”, is 60km/h, Type A, is 52km/h and for Type B 37km/h.

The impact performance of the APD shall be measured in accordance with the dynamic test defined in Appendix A. The following conditions shall be met:

### **Type A “plus+” Barrier - 60km/h - For Long Track/Grass Track and Speedway**

The peak acceleration, filtered at CFC180, shall not exceed 35g

The maximum energy absorbed before the acceleration exceeds 20g shall not be less than 5,000J

The rebound energy shall not exceed 25% of the impact energy.

### **Type A Barrier - 52km/h - For Long Track/Grass Track and Speedway**

The peak acceleration, filtered at CFC180, shall not exceed 35g

The maximum energy absorbed before the acceleration exceeds 20g shall not be less than 4,000J

The rebound energy shall not exceed 25% of the impact energy.

### **Type B Barrier - 37km/h - For Speedway only**

The peak acceleration, filtered at CFC180, shall not exceed 35g

The rebound energy shall not exceed 30% of the impact energy.



## APPENDIX A: SAFETY BARRIER TEST PROCEDURE

### A1. Apparatus

#### Rigid Wall

The rigid wall shall be at least 1m high and shall have an effective length equal to that of the safety barrier. The front face of the wall shall be flat, straight and vertical  $\pm 2^\circ$ .

#### Crash Test Dummy

The crash test dummy shall be based on the Black Tuffy body-form, specified by SAEJ944, with the following inclusions or modifications:

Mass	75kg $\pm$ 1kg
Impact surface area	0.24m <sup>2</sup>
CoG vertical	550mm $\pm$ 25mm from the top of the head
CoG longitudinal	Not specified
CoG transverse	Central axis of crash test dummy

#### Test Facility

A method of projecting the crash test dummy at the safety barrier shall be provided. The direction of motion shall be  $90^\circ \pm 2^\circ$  to the front face of the rigid wall. At the moment of impact the crash test dummy shall be vertical  $\pm 2^\circ$  and the base shall be [100] mm  $\pm$  25mm above the ground. A method for measuring the impact velocity of the crash test dummy shall be provided.

### A2. Instrumentation

The crash test dummy shall be fitted with a tri-axis accelerometer at the CoG. All instrumentation shall conform to SAE J211 (latest revision) and ISO/DIS 6487; 1996E with a channel frequency class (CFC) of 180 and channel amplitude class (CAC) of 500g. The sampling frequency shall be at least 10,000Hz. The time of first contact between the crash test dummy and the barrier shall be measured and recorded as Time-zero.



### **A3. Environmental Conditions**

Temperature: 25°C ± 5°C

### **A4. Safety barrier Installation**

The safety barrier shall be installed in front of a rigid wall in accordance with the manufacturer's instructions in order to closely represent the in-track installation.

### **A5. Impact Velocity**

The impact velocity for Type A "plus+" barriers shall not be less than 60km/h

The impact velocity for Type A barriers shall not be less than 52km/h

The impact velocity for Type B barriers shall not be less than 37km/h

### **A6. Results**

The results shall be presented on A4 paper and shall include:

- (a) Thickness of barrier (m)
- (b) Actual impact velocity and impact energy (km/h, J)
- (c) Resultant acceleration-time history of the crash test dummy - CFC180 (g,s)
- (d) Peak resultant acceleration - CFC180 (g)
- (e) Velocity<sup>1</sup>-time history of the crash test dummy (m/s, s)
- (f) Resultant acceleration-displacement<sup>2</sup>. History of the crash test dummy - CFC180 (g,m)
- (g) Peak dynamic deformation (m)
- (h) Rebound velocity and rebound energy (km/h, J)
- (i) Calculation of the maximum energy absorbed before the acceleration exceeds 20g

<sup>1</sup>. The velocity shall be calculated by single integration of X-acceleration.

<sup>2</sup>. The displacement shall be calculated by double integration of X-acceleration.