



FIM RACING HOMOLOGATION PROGRAMME FOR LIGHT PANELS (FRHPlp)

HOMOLOGATION MANUAL - FRHPlp-01 GENERAL TERMS AND CONDITIONS

2024

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I. GLOSSARY

A. General terms of the FIM Racing Homologation programme

Applicant	Legal entity applying for the FRHP before the FIM. The applicant shall be the company that markets the light panel to its end-users through customary sales channels (wholesalers/retailers/direct sales) or sells and/or supplies the light panel to circuits. The Applicant may, and in many cases will, also be a light panel manufacturer.
Application Form (homologation or update)	Part of the Homologation Manual, to be completed by the Applicant while applying for the FRHP.
FMN	National Motorcycling Federation affiliated to the FIM.
FRHP	FIM Racing Homologation Programme which grants recognition to products of compliance with safety requirement required for competitions.
FRHP1p	FIM Racing Homologation Programme for Light Panels. FRHP that grants recognition to light panels that meet the FIM light panels Standard.
FRHP1p-01	Current version of the FIM Light Panel Racing Homologation Programme
FIM Racing Homologation	Official confirmation issued by the FIM acknowledging that Products comply with the required technical safety and competition requirement and meet particular specifications related to performance.
FIM Product Standard	Set of testing methods and corresponding performance criteria on the basis of which a Product may be granted an FIM Racing Homologation.
Homologation Emblem	Emblem issued by the FIM that includes the Applicant logo, the FRHP logo, the category of Product and the Product Model .
Homologation Fee	Cost associated with the homologation of a Product by the FIM as set out in this Homologation Manual.
Homologation Label	Official label provided exclusively by the FIM to the Applicant once homologation has been granted.
Homologation Manual	Formal document setting out the technical information, criteria and general contractual terms and conditions applying to the Applicant upon submission of its Application Form. The Homologation Manual shall be duly filled in, signed and returned by the Applicant to the FIM. This is a precondition for the homologation to proceed.

Homologation Notice	Contractual document that grants the homologation to the Applicant for a specific Product and sets out the specific conditions applicable to the Applicant.
Homologation Refusal	Formal letter transmitted by the FIM to the Applicant in the event that homologation is not granted to an Applicant for a particular Product Model.
Intellectual Property Rights	All trademarks, trade and business names, patents, copyright (including copyright in a computer program), database rights, design rights, registered designs, utility models, semi-conductor topography rights, inventions, know-how, confidential information and all other intellectual property and rights of a similar or corresponding nature in any part of the world, whether or not registered or capable of registration, in respect of such rights which are registrable and all applications for registration of any of the foregoing rights.
Personal Data	Any information relating to an identified or identifiable natural person; an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person.
Product	Any sort of light panel (FRHPlp), helmet (FRHPhe), barrier (FRHPba), and paints (FRHPpa) submitted by the Applicant for the homologation.
Product Model	The Model of Product indicated in the Application Form.
Product Sample	Unit of the Product that must be submitted by the Applicant at its cost to the FIM or the Testing Laboratory.
Supplier	Any third party that provides parts or material to assemble or to manufacture the product submitted by the Applicant for the FHRP.
Testing Laboratory	Private, public or private/public entity that has received an assignment from the FIM to perform tests according to a certain Homologation Manual and for the FRHP.
Test Report	Document issued by the Testing Laboratory that contains the test results relatively to a specific Application Form.

B. Terms applicable only for light panels

Background-board	Structure that surrounds the graphic area of the panel, to provide improved visibility by means of an increased contrast with the surrounding illuminance.
CIE 1931 standard colorimetric system	A system for specifying the colour by determining the tristimulus values of the spectral power distribution of a coloured light.
Colour coordinates	The chromaticity of the colour is set in accordance with the CIE 1931 Standard Colorimetric Diagram unless stated otherwise.
Duty cycle	Fraction of one period in which the light is on during the flashing operation.
FIM Light panels standard	Set of testing methods and corresponding performance criteria on the basis of which light panels may be granted a FIM Racing Homologation.
Flashing operation	Mode of operation in which the light is switched on and off with a fixed period and duty cycle.
Front Screen	A screen that protects the graphic area and all its parts against dust and water.
Graphic area	Flat surface containing an array of light-emitting diodes (LEDs) as pixels. When voltage is applied, pixel clusters are controlled and activated partly or fully, into forming the characters or pattern of the desired message.
Light Panel Model	The model of light panel indicated in the Application Form.
Light Panel System	A light-emitting object that is activated in conjunction with other elements to display the desired message. It comprises of the following parts: <ul style="list-style-type: none"> a) A certain number of light panels b) A marshal control device associated with each light panel c) A main server d) A race control management software
Light Panel	Flat panel display, which comprises of a frontal and a rear graphic area, and may include the housing, the background-board and/or the front screen. It is activated in conjunction with other light panels to display the desired message.
Light Panel Information	Flat panel for the start/finish line position. Information panels must be from the same supplier as the circuits chosen light panel supplier and operated from the same software.
Light Panel Sample	Particular unit of a Light panel Model submitted by the Applicant to the FIM for the homologation of such product.
Light Panel Batch Size	Typical batch size of a certain Light panel Model

Luminance	The intensity of light emitted from a surface per unit area in the reference axis direction given in [cd/m ²]. It carries information about the brightness of the displayed message.
Main Server	Central unit that manages the input signals received from either a Marshal Control Device or the Race Control and elaborates them into power commands, to execute the desired message.
Marshal Control Device	Hand-held, water resistant controller, used to execute or change a display message by the local marshal control.
Pixel	Smallest element that contains LEDs and is capable of generating the full functionality of the graphic areas of a light panel.
Pixel pitch	Distance between corresponding LEDs of adjacent pixels, both horizontally (H_{pitch}) and vertically (V_{pitch}).
Race Control Management Software Platform	Software used to manage and control all the connected light panels remotely and synchronously.
Reference axis	The axis originating on the reference centre of the test module being perpendicular to the frontal surface of the panel, unless otherwise specified by the manufacturer. In case it differs from the mechanical axis (maximum light intensity), the supplier could choose which axis to use for the performance tests.
Test axis	The line from the reference centre of the test module to the luminance meter head.
Variable Message Sign (VMS)	Electronic signs used to transmit information to riders, marshals and track personnel, which may consist of flag coloured signals, and/or symbols and/or text.
Viewing Angles	The horizontal viewing angle is the angle between the test axis and the vertical plane passing through the reference axis, and the vertical test angle is the angle between the test axis and the horizontal reference plane passing through the reference axis.

II. FOREWORD

On the basis of a more complete and demanding evaluation of performance and to give specific and exclusive recognition to light panels that meet more demanding criteria, the FIM International Technical and Circuit Racing Commissions have now launched a pioneering and unique programme, the FIM Racing Homologation Programme for light panels (FRHPlp), which features state of the art methods of testing.

Under this programme, the FIM will grant a Homologation Certificate and Homologation Labels, which will be a mandatory prerequisite for the Product to be entitled to be used on Circuits for FIM competitions.

To obtain such homologation, the Product submitted for the application will have to meet the high performance and quality standard set by the FIM.

The Product properties will be evaluated through a test protocol which should increase the visibility and safety for signalling marshals through remote functionality, as well as enhancing the direct communication of regulatory requirements and notifications to competitors during FIM Championship competitions.

As of 2022, FIM Homologated light panels will be mandatory for MotoGP, WSBK and EWC and recommended for all other Circuit Racing FIM World Championships and Prize events. The homologation will allow the FIM to ensure that a high-quality light panel is used in FIM competitions. It will also help to preserve the interests of the homologated light panels' manufacturers.

The document provides the **TECHNICAL INFORMATION AND CRITERIA** and the **TERMS AND CONTRACTUAL CONDITIONS**, for interested parties wishing to apply to the Programme.

As the light panels can also be used for FIA circuits and the requirements are the same, it is recommended that the Applicant apply for homologation from both entities at the same time. Where homologation has already been granted by the FIA, FIM homologation may, subject to certain conditions, be granted at the FIM's discretion on the basis of the test report sent by the FIA.

This document is subject to amendment as determined by the FIM.

III. SCOPE

By submitting its Application Form to the FIM, the Applicant undertakes to comply with all the obligations and conditions stipulated in this Homologation Manual, of which the Appendices are an integral part. No Application Form will be considered if this Homologation Manual is not previously signed by the Applicant.

The Homologation Manual - FRHPlp-01 sets out objective design and performance requirements for light panels intended for use in motor racing circuits. It addresses systems that are specifically designed for motorsport applications and that provide dual control, such as local stand-alone operation via the marshal control device and remote operation by the Race Control.

This standard defines different homologation Grades as follows:

- a) Grade 1 and grade 2 homologation will be for all Circuit Racing FIM World Championships and Prize events;
- b) Grade 3 homologation will not be used for Motorcycle competition.

The requirements for Grades 1, 2 and 3 presented herein will ensure that the light panels will have a minimum luminance within a certain range of vertical and horizontal angles as well as the required set of colour coordinates, to improve rider visibility across all the circuit grades. The standard also details the flag signals and their functions during race conditions.

This document is not intended to outline any details concerning the location and number of light panels. In principle, the location and the numbering of the light panels will be organised along the same lines as the marshal posts, in either a full circuit or partial circuit installation; adjustments in the location and the numbering of the light panels may be required to accommodate different types of racing.

IV. TERM

The terms and conditions of this Homologation Manual shall enter into force from the submission of the Application Form or the signature of this Homologation Manual by the Applicant, whichever is the earlier; they shall remain in force either during the Term of the Homologation Notice if the FIM Racing Homologation is granted, or until the Application is withdrawn if the FIM Racing Homologation is rejected.

V. TECHNICAL INFORMATION AND CRITERIA

V.1 PRODUCT REQUIREMENTS

Light panels shall be based on light-emitting diode (LED) technology. Each light panel shall have two graphic areas, one on the front and one on the rear side of the panel. The rear area may have different patterns and dimensions those required for the frontal area, as detailed in Section **V.1 PRODUCT REQUIREMENTS, F. Minimum dimensions requirements**.

Each Light panel should be able to be controlled either remotely from Race Control or manually by the individual signalling marshal at the track. It should be provided with a system that provides field-adjustable luminance intensity (dimming), to adapt to the background ambient light level in which race events are held. Due to extreme operating conditions, they should be provided with means of protection against thermal overload.

A. Electrical requirements

The light panel system shall conform to ISO electrical safety requirements and low voltage Directives for maximum safety, in compliance with local regulations. Circuits and connectors must be located out of reach of the public and designed so that exposure to live electrical equipment will not occur in case of the accidental detachment of exposed elements of the system.

The connection of the light panel system to the power supply shall be in accordance with the manufacturer's guidelines. In the event of short voltage interruptions in the supply of specific duration, Light panels shall operate as follows:

- a) For interruptions of duration less than 50 [ms], there should be no visible effect.
- b) For interruptions of duration less than 100 [ms], the panels shall continue displaying the current message.

B. Material requirements

Materials used for the hardware of the light panels shall be resistant to corrosion. The FIM reserves the right to request manufacturers to carry out testing on the material, to demonstrate the durability of the material by reference to the relevant European Standard EN 12899-1:2001, or similar European technical assessment. Additionally, all equipment, cables and controls shall be made out of materials that will not present a risk of fire or any related risks in case of an incident.

C. Environmental requirements

All equipment must be designed to operate under the following requirements:

- a) The minimum degree of protection against ingress of dust and water provided shall be IP 65 without external casing and IP 55 with external casing, when tested in accordance with BS EN 60529:1992.
- b) Temperature: -20 to +60 [°C]
- c) Relative humidity: 30% to 95% RH

The manufacturer shall provide a declaration to the FIM, by which it certifies that the system is capable of exposure to such environmental conditions without suffering any permanent damage. The FIM reserves the right to conduct testing in accordance with the relevant European Standards to check compliance with these requirements, and to refuse the homologation if the results are deemed unacceptable.

Equipment performance should not degrade or deviate significantly from the homologation test results when operated at the typical ambient temperature extremes seen at the intended installation site.

D. Structural requirements

All equipment must be designed so that it can be operated safely under normal conditions by the marshals and other track personnel. The equipment must remain safe after damage by an accident to allow operational safety. Reliability of all equipment, cables and controls shall be guaranteed for a minimum of approximately 5 (five) years' extensive usage.

E. Operational requirements

Each light panel should be able to be locally operated by the signalling marshals on the side of the track and remotely controlled from the Race Control.

1. Local operation

Light panels shall be locally operated by the signalling marshals via the corresponding marshal control devices, either in the direct proximity of the panel or at a nearby location. For system design purposes it should be possible to operate the panel within a distance of up to 250 [m].

2. Marshal Control Device

For panels that are operated locally, the marshal control device should be designed so as to be as compact and light as possible, to be easily operable and transportable, and provide an intuitive user interface. It should preclude the possibility of accidental operations. The control device must be rechargeable and able to be operated while being recharged. It can be either button-based or touched-based. It shall be easy to operate with appropriate gloves and could be equipped with LED light indicators, to display different modes of operation of the unit, as well as an informational display. The display should give information about the status of the device, the corresponding panel and incorporate repeater lights, to show the status of the light panels at the neighbouring marshal posts upstream and downstream.

3. Remote Operation

The information displayed on the light panels should always be relayed directly to the Race Control, who should always have the capability of operating them remotely. Flag signals reserved for the Race Director and the Clerk of the Course must be solely operable by the Race Control.

4. Race Control Management Software

The Race Control program should give Race Control complete control of all the light panels around the track, to allow real-time monitoring of the flags' status and diagnose the main system parameters. In particular, the features the Race Control program must include, as a minimum:

- a) Track map displaying all the light panels and their locations on the track;
- b) Monitoring of the operating power supply;
- c) Monitoring and control of all light panels' status, i.e. which flag type and which light marshal is active on the track;
- d) Monitoring of working temperature, and cooling system activation;
- e) Display of any malfunctions, such as short circuit, thermal overheating for each individual light panel, LEDs integrity, communication errors;
- f) Log systems stored in the internal memory of the battery, which register all the operations accomplished as well as the flag incidents on the track, including detailed information on the flag type, the activation point, date and time of the incident;
- g) Systems check and communications check with all equipment constituting the system;
- h) Option for online servicing and upgrading.

Additional features may be provided but should not interfere with any of the above. Any command locally executed by a marshal via portable controller should be able to be overruled by the main Race Control.

F. Minimum dimensions requirements

The minimum required dimensions of the light-emitting frontal and rear graphic area of each light panel in the direction of the reference axis should be as detailed in the Table 1. The aspect ratio of panel shall lie between 3:2 and 1:1.

Each panel shall be designed such that the whole of the front and rear graphic areas shall be fully and uniformly populated with pixels.

Grades	Graphic Area (Frontal) in [cm²]	Graphic Area (Rear) in [cm²]
Grade 1	4500	360
Grade 2	1890	360
Grade 3	1890	360

Table 1: Frontal/Rear Panel Minimum Dimensions for light emitting area.

G. Weight

A maximum of 50 [kg] is mandatory for any grade of light panel. This does not include cables, brackets or optional equipment such as controllers.

H. Front screen

When the light units are provided with an additional front screen, the latter should be securely fitted to the external panel housing. It should be made from UV and scratch resistant materials and be easily removable to facilitate maintenance. It is also recommended to have a certain inclination with respect to the vertical axis of the light panel to prevent reflections from the sunlight.

Manufacturers should detail the measures they have taken to prevent condensation from forming on the front screen.

I. Frontal frame

When frontal frame is used, the front contour of the board must be matt black or dark coloured, to improve the overall contrast with the surrounding illumination and enhance the perception of the information displayed.

J. Variable Message Sign (VMS)

The information displayed on the panels should be to supplement traditional circuit flags during racing, and shall consist of static or waved coloured signals, with the appropriate brightness level and colour coordinates.

Display in form of symbol or text must be such that the text is abbreviated in English and the height of each character is at least half of the height of the frontal and rear graphic area. It is required that the message can be easily customized for the specific needs and different ways of operation, to accommodate the type of racing event or other FIM Championship requirements. The minimum level and basic functions of static and waved flag signals shall be defined using the specifications detailed in **APPENDIX 2, Flag Display Modes**.

Some specific properties are required for “Information Panels” and shall be defined using the specifications detailed in **APPENDIX 3, Light Panels Information for FIM Championships**.

K. Data Communication Protocol

Light panels should be networked with each other and the corresponding marshal control devices, and maintain a two-way communication with the Race Control, via a redundant fibre-optic ring network or a wireless radio communication link.

V.2 PERFORMANCE ASSESMENT

The light panel system shall be designed so that its integrity is not compromised during its entire service life. Clear and comprehensive guidelines are required to operate the system under normal conditions correctly. The FIM reserves the right to refuse the homologation if the installation and maintenance procedures are deemed unacceptable.

A. Installation guidelines

When applying for the homologation, the manufacturer must provide installation guidelines of the light panel system to the FIM as part of the homologation application documentation.

These guidelines shall include detailed information to enable the correct installation. The manufacturer undertakes not to modify the fundamental installation procedure included in the guidelines. Variations must be authorised by the FIM. The FIM reserves the right to refuse the homologation if the installation procedure is considered unacceptable.

B. Maintenance guidelines

When applying for FIM homologation, the manufacturer must provide maintenance guidelines of the light panel system to the FIM as part of the homologation application documentation, to ensure that any damage does not reduce the efficiency of the system. This shall include details of routine maintenance recommendations of spare parts and details of the estimated lifetime of components. For permanently installed systems, all maintenance activities shall be easy to carry out and ensure maintained performance, as outlined in Section **V.3 TESTING PROCEDURES**. The manufacturer shall also offer a maintenance service if required.

V.3 TESTING PROCEDURES

The performance requirements presented herein are mandatory for light panel systems. The FIM reserves the right to request further tests if new technology is presented for homologation.

A. Test parameters

The test module and the test facility shall comply with the requirements set out below.

1. Test module

The test module shall be complete with all the hardware components of a light panel, but also cables, controllers and/or data transmission/reception equipment that are fitted in a production unit, to enable performance testing. The test module shall be selected at random from the production and shall be fully representative of the final Product. For the purpose of testing and due to limitations of the currently used test apparatus, the manufacturer is required to inform the FIM and the test laboratory in advance about the overall size and weight of the panel.

If a final prototype is made available for testing, the manufacturer is required to declare and confirm that the characteristics of the final Product do not differ from those of the test module considered for the performance testing. The manufacturer commits to obtaining the FIM's approval before any substantial modification to the tested and approved Product is carried out. The FIM reserves the right to refuse the request if the final prototype is deemed unacceptable for the purpose of the homologation testing.

2. Test facility and apparatus

All the performance testing specified herein shall be performed in a temperature-controlled dark-room, whose conditions during testing shall be consistent with Table 2.

Condition	Requirement	Remark
Dark-room illuminance	< 2 [lux]*	Near the panel
Room temperature	23 ± 4 [°C]	Near the panel
Relative humidity	10 to 80 %	

Table 2: Test facility requirements (*A lower value is used for colour measurements)

During testing, it is important to eliminate any stray lights. If parts of the equipment used for controlling the test module under test affect the surrounding illuminance, then those parts should be adequately covered.

A calibrated photometric laboratory with light intensity measurement instrumentation is required for the execution of the performance tests.

B. Test module preparation

The test module should be securely mounted onto a rotating measuring table. Care should be taken to ensure it is securely fixed and the optical orientation of the frontal surface in relation to the measuring device is correct. This is important to assure that the assessment will be done at the required inclinations of the graphic area of the panel, and for good repeatability of the test results. If required

for reasons of geometrical or physical constraints of the panel, any alternative mounting outside of normal conditions shall be approved by the FIM prior to testing.

The working distance between the front lens of the measuring device and the frontal graphic area of the test module over which the meter can focus shall be minimum 10 (ten) meters.

Before commencing the performance tests, the following checks shall be undertaken:

- a) Switch ON the test module in white, non-flashing mode, and check that there is no partial, incomplete or false display;
- b) Set the voltage to the specified operating voltage of the light panel, and check that there is no partial, incomplete or false display;
- c) Record the specified operating voltage of the test module, which should correspond to the normal user conditions for power supply. If the operating voltage is known to vary in practice, either because of fluctuations of the electricity supply during operation or because the signal is operated at different voltages depending on ambient conditions, measurements shall be made at the lowest and highest likely operating voltage in addition to measurements made at the specified operating voltage.

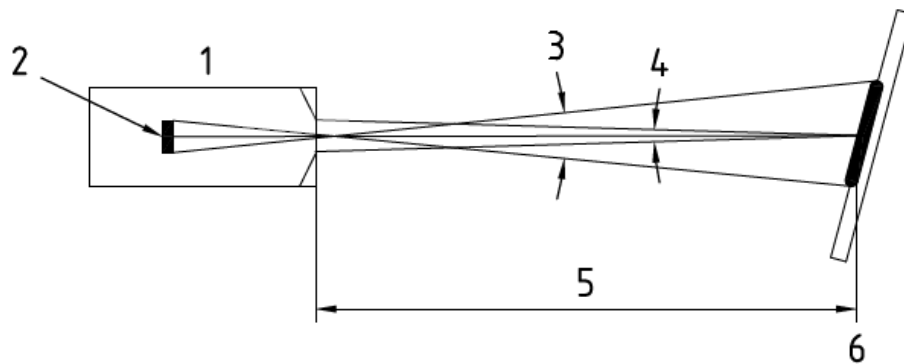


Figure 1

- Legend:
- 1 Luminance meter
 - 2 Photo-sensitive element
 - 3 Field of View (FOV)
 - 4 Acceptance cone
 - 5 Working distance
 - 6 Test module

1. Stabilization phase

The test module shall display the white flag at its maximum brightness, and have been in operation for sufficient time to be stabilised before making any performance measurement. The resulting light on the test module is considered stable when its output luminance, measured in $[\text{cd}/\text{m}^2]$, does not change more than $\pm 3 \%$ over a warm-up period of 30 minutes. Similarly, the chromaticity coordinates shall be recorder throughout the warm-up period of 30 minutes at 2 minutes intervals, to assure they lay within the specifications defined in **C. Optical performance, 3 Colour Coordinates**. Drop peaks in the luminance measurements at the beginning of the test will not be taken into consideration.

C. Optical performance

All the performance measurements set out herein shall be performed for the individual flag signal colour, such as White, Yellow, Red, Blue and Green. The test procedures are grouped and shall be conducted in the sequence laid out below for each of these individual flag signal colours.

The test environmental conditions are specified in Section **V.3 TESTING PROCEDURES, A.2 Test facility and apparatus** of this standard. The measurements shall be made at the specified operating voltages of the light panel, or in accordance with the manufacturer's instructions as set out in Section **V.3 TESTING PRODECURES, B. Test module preparation**.

1. Luminance

Luminance gives an indication of the overall perception that result from light reaching the rider's eye. The resulting brightness takes into consideration the measurable luminance of the surface of the light panel, plus any conditions of observation that may affect the perception. Luminance measurements are applicable to the following flag signal colours: white, yellow, red, blue and green.

a) Test conditions

The measurement configuration shall be arranged so that the luminance meter is perfectly aligned with the reference centre of the test module, perpendicular to the reference axis. The test will be conducted as follows:

- i. Luminance measurements shall be made with the test module powered to the specified operating voltage, or in accordance with the manufacturer's instructions.
- ii. One luminance reading shall be taken per each of the individual flag signal colours in direction of the reference axis, and the corresponding value shall be recorded and expressed in candela per square metre $[\text{cd}/\text{m}^2]$.

b) Performance criteria

When the test module is tested in accordance with this standard:

- i. For Grade 1 homologation, the minimum on-axis luminance shall be 60'000 $[\text{cd}/\text{m}^2]$ for yellow flag signal and 37'000 $[\text{cd}/\text{m}^2]$ for red flag signals.

- ii. For Grade 2 homologation, the minimum on-axis luminance shall be 33'000 [cd/m²] for yellow flag signal and 16'000 [cd/m²] for red flag signals.
- iii. For Grade 3 homologation, the minimum on-axis luminance shall be 10'000 [cd/m²] for yellow flag signal and 8'000 [cd/m²] for red flag signals.

2. Uniformity of Luminance

The test module shall appear uniformly bright over its entire frontal graphic area, and shall have no abrupt changes of luminance. Luminance uniformity measurements shall be done in accordance with this standard and shall be applicable to the following flag signal colours: white, yellow, red, blue and green.

a) Test conditions

To measure the luminance uniformity, the frontal graphic area of the test module shall be virtually divided into $3 \times 3 = 9$ test areas and the luminance reading shall be taken and averaged over each of these areas. The corresponding values shall be recorded and expressed in candela per square metre [cd/m²].

b) Performance criteria

When the light panel is tested, the ratio of the greatest and the least luminance readings [cd/m²] measured from each of these regions shall not deviate more than 20%.

3. Colour coordinates

Colour coordinates specify the allowable colours for steady signal lights and flashing signal lights.

a) Test Procedure

The spectral power distribution of the light emitted by a signal light should be measured using a spectroradiometer and the 1931 CIE chromaticity coordinates (x, y) shall be calculated using the methods and tables outlined in the European Standard CIE S004 Colours of Light Signals. Alternative methods may be used, provided it has been validated by reference to the spectroradiometric method and approved by the FIM prior to testing.

b) Performance criteria

When the light panel is tested in accordance with this standard, the colours of light signals shall have chromaticity coordinates (x,y) that lie inside the following areas (as detailed in **APPENDIX 1 CHROMATICITY COORDINATES**):

- i. Red Light Signal Colour: Class A1

Red light signal colours shall lie within the chromaticity area ABC'D'¹

- ii. White Light Signal Colour: Class A
White light signal colours shall lie within the chromaticity area IJKL¹²
- iii. Green light signal colour: Class A
Green light signal colours shall lie within the chromaticity area MNOP1
- iv. Blue Light Signal Colour: Class A
Blue light signal colours shall lie within the chromaticity area QRST1
- v. Yellow Light Signal Colour: Class FIA 1
Yellow light signal colours shall lie within the chromaticity of the “Selective Yellow” region of the UNECE R48 standard (SY1 to SY5, also detailed in **APPENDIX 1 CHROMATICITY COORDINATES**).
- vi. Orange Light Signal Colour:
Orange light signal shall lie within the chromaticity of the area EFGH of the CIE 1931 standard colorimetric system, (also detailed in **APPENDIX 1 CHROMATICITY COORDINATES**).

Detailed information concerning the boundaries of the recommended chromaticity areas is provided in the **APPENDIX 1 CHROMATICITY COORDINATES**.

4. Viewing angles

The viewing angles of a light panel are measured both horizontally and vertically, and indicate over what range and with what luminance the information displayed on the graphic area of the panel is visible in relation to the reference axis of the frontal graphic area of the test module. This is considered of great importance to assure correct perception of the information displayed.

a) Test conditions

Tests will be conducted as follows:

- i. One luminance reading shall be taken for each of the individual colours at 5 degree intervals to the right and left of the reference axis and the corresponding values shall be recorded and expressed in candela per square metre [cd/m²].
- ii. One luminance reading shall be taken per each of the individual colours at 5 degree intervals above and below of the reference axis and the corresponding values shall be recorded and expressed in candela per square metre [cd/m²].

b) Performance criteria

¹ It includes persons in the user group with defective colour vision

² Given the fact that the colour of a white signal shifts toward orange-yellow when viewed from longer distances, this class help to distinguish from yellow light signal colours

The required distribution of luminance should be as follows:

- i. The intensity within 40 [°] to the right and left of the reference axis shall be above 50% of the minimum intensity required for that specific Light Panel grade.
- ii. The intensity within 15 [°] below and above of the reference axis shall be above 50% of the minimum intensity required for that specific Light Panel grade.

No drastic luminance drop should occur in angles over those indicated above, $\pm 40^\circ$ and $\pm 15^\circ$ respectively.

5. Colour shift

During the previous tests, not only the luminance of the Light Panels is affected, but also the colour perception to the human eye. Although no performance test is conducted regarding this matter exclusively, the colour coordinates should be within the chromaticity areas indicated in 6.3.3 Colour coordinates when the different tests are performed.

a) Performance criteria

During the different tests, at least 90% of the evaluated points should be within the specified colour regions.

6. Visible Flicker

Light Flicker is a physical phenomenon which cause changes in the brightness of a light source. Although this can happen due to numerous facts, the test performed will be based on the fluctuations of the power supply voltage.

According to the International Commission on Illumination, flicker can be defined as the “impression of unsteadiness of visual perception induced by a light stimulus whose luminance or spectral distribution fluctuates with time” (CIE, 2011, term 17-443),

a) Performance criteria

Minimum flickering frequency should be over 200 Hz. A higher number could be requested where the symbols, signs and flags are not seen correctly by the racing drivers or by the TV cameras.

7. Sun phantom

Sun phantom is a false light signal caused by reflection of radiation from sun illuminance by the graphic area of the test module. The sun phantom effect makes a light panel appear to be switched ON when in fact it is OFF, thus confusing the rider.

a) Test conditions

Tests will be conducted as follows:

- i. The frontal surface of the test module shall be illuminated by a projector simulating direct sunlight. The reference axis of the test module and the optical axis of the projector shall form an angle of 10 [°] below the reference axis. The opening angle of the projector emitting surface seen from the front surface of the roundel (angle α) shall be smaller than 1[°], while the opening angle of the photometer seen from the front surface of the roundel shall be smaller than 3 [°]. The distance between the front surface and the photometer lying on the reference axis of the roundel shall be 10 [m].
- ii. The luminance of the test module should be measured along the reference axis when the test module is switched on and the projector is switched off (L_{signal}).
- iii. The luminance of the test module should be measured along the reference axis when the test module is switched off and the projector is switched on: ($L_{\text{phant},10\text{klx}}$). The projector should produce an illumination in the plane of the front surface of 10'000 [lux]. If the effective illuminance ($E_{\text{t,eff}}$) in the plane of the front surface is not 10'000 [lux], then $L_{\text{phant},10\text{klx}}$ can be calculated from the measured $L_{\text{phant,eff}}$ as specified in the European Standard CIE S006.1/E.

b) Performance criteria

The phantom light luminance ratio $L_{\text{signal}} / L_{\text{phant},10\text{klx}}$ of the intensity of the real to false signals shall be at least 15 to 1.

D. Test Report

The test report should include all the information recorded as a result of the performance assessment of the light panel in accordance with Section **V.3 TESTING PROCEDURES**. Additionally, the test report should include at least the following information about the test:

- i. Photographs of the light panel system as well as batch number and date of manufacture;
- ii. A complete listing of the test equipment, which shall include instrument accuracy and calibration certificates copies
- iii. Photographs of the equipment used for the application of the light panel;
- iv. Any additional information requested at the discretion of the FIM.

E. FIM Marking and Labelling

Each light panel that has passed the requirements of this standard will have to be clearly labelled with FIM Label, which include an FIM hologram, to be glued onto the light panel. The FIM Label must be purchased from the FIM.

F. Manufacturer's Guidelines for Handling, Storage and Disposal

The manufacturer is required to provide the following documentation with each delivery:



- v. Installation guidelines;
- vi. Handling and Storage Guidelines (if applicable);
- vii. Maintenance guidelines;
- viii. Disposal guidelines;
- ix. FIM Homologation Certificate, based on the template provided by the FIM.

The additional information set out above must always be provided with each FIM homologated light panel. It is possible to provide the same information in an electronic version.

VI. CONTRACTUAL TERMS AND CONDITIONS

A. Application

In order to apply for the FIM Racing Homologation, the Applicant shall send the present Homologation Manual, duly completed and signed, with the requested information and attached documents (Application Form (homologation) to the FIM International Technical Commission (fhrp@fim.ch)). By doing so, the Applicant thereby confirms formal acceptance of the rules and procedures contained in the Homologation Manual, including the Technical Information and Criteria, the Terms and Conditions as well as the Application Form.

The Applicant shall apply for the FIM Racing Homologation for all specific Models of the Product which are intended for use in the related FIM events.

Only complete applications will be taken into consideration and it is the responsibility of each Applicant to ensure that all relevant information and documentation is provided. The FIM may request any further information it deems necessary. Applicants shall respond to any such request promptly and within the specified deadline if any.

Once the application is completed, the FIM will request that the Applicant send free of charge new and virgin Product Samples to, and only to, the following Testing Laboratory.

The Applicant shall not charge the FIM or the Testing Laboratory for the cost of the Product Samples.

Any duties, VAT or other taxes, levies, expenses or other charges payable in relation to the provision and delivery of Product to the FIM respectively the Testing Laboratory and/or the handling of such Products Samples (e.g. delivery cost, shipping cost, customs clearance costs, including the return of any Product Sample, if applicable) shall, irrespective of the place of delivery, be declared and paid by the Applicant at its own cost.

B. Data Protection

By applying to the FRHPlp and to access FIM homologation services and products, the Applicant authorizes FIM to collect, store, process, transfer and use its Personal Data in accordance with the EU General Data Protection Regulation and the Federal Act on Data Protection of Switzerland where FIM is incorporated. Unless the Applicant indicates otherwise, the consent the Applicant provides by applying to FRHPlp shall be considered express and valid indefinitely.

By applying to the FRHPlp the Applicant also authorizes FIM to transfer its Personal Data to any third parties (notably laboratories etc.) assisting in the management and implementation of the FIM homologation services, located in other countries with laws that may not guarantee the same level of data protection as Switzerland. The Applicant authorizes these third parties to use, retain and store its Personal Data for the purposes of the homologation services and products.

Further information concerning the privacy policy of the FIM Racing Homologation Program can be found on this website <https://www.frhplp.org/>.

The Applicant is also entitled to request FIM to withdraw its consent, erase, rectify or obtain any personal data FIM holds about the Applicant by sending its written request to gdpr-request@fim.ch.

In case the Applicant withdraws its consent or requests that its Personal Data be erased, FIM may be totally or partially unable to provide its homologation services or products.

C. Intellectual Property Rights

By applying to the FRHPlp, the Applicant acknowledges that the names of the FIM, the FIM Marks, the FIM Homologation Visuals, Emblem and Labels, the FIM logos, trademarks and/or trade names of or used by FIM (whether registered or unregistered or whether registrable or not) constitute an exclusive property of the FIM and/or that the FIM holds an exclusive title for their usage. The Applicant shall consequently under no circumstances make any use of such names of the FIM, the FIM Homologation Visuals, Emblem and Labels, the FIM logomarks, trademarks or trade names in a separate or combined manner either during the Homologation Notice or following its termination, contrary to the provisions of this Homologation Manual.

In addition, the use of the FIM Homologation Visuals, Emblem and Labels, the FIM logos by the Applicant shall under no circumstances give rise (directly or indirectly) to the mistaken impression on the part of the public and consumers (in particular) that the FIM might be considered as the manufacturer (or the manufacturer of any component part) of the Applicant's Product.

The Applicant agrees that he will not register, or cause to be registered, in any territory whatsoever, any name and/or denomination of any FIM Marks, Competitions and/or its classes or any logos, trademarks and/or trade names of the FIM or used by the FIM (whether registered or not or whether registrable or not) in connection with its activity, or any other trademark, trade name, word, logo or symbol that is identical or similar to any such name and/or denomination of any FIM Marks, the FIM Homologation Visuals, Emblem and Labels, the FIM logos, trademarks or trade names trademark and/or trade name (whether registered or not or whether registrable or not).

By applying to the FRHPlp, the Applicant represents and warrants that its application does not infringe the trademark and trade name rights of any third party. The Applicant is solely responsible for ensuring that this is the case.

The FIM may request evidence of a licence to use a third party's trademark and/or trade name. If the FIM considers that such a licence has not been validly obtained it may at its sole discretion refuse the application, or request that changes be made to the application.

The Applicant shall promptly inform FIM of any infringement of any intellectual property rights of the FIM that comes to the Applicant's attention.

The Applicant undertakes to provide, free of charge and royalty free, its trademark logo to be used by FIM in the FIM Homologation Emblem.

The Applicant shall indemnify and hold harmless the FIM from and against all claims, damage, losses, costs, (including, without limitation, all reasonable legal costs), expenses, demands or liabilities put forward by third parties for illegal competition, violation of copyright, claims of trademarks or industrial and intellectual property claims that may result from the activity of the Applicant not duly authorised by the FIM.

Regarding the FIM Homologation Emblem and Homologation Label, the FIM and the Applicant agree that:

- x. title to any and all rights in the FIM Homologation Emblem and Homologation Label shall vest in the FIM, save for rights in the Applicant trademark element of the FIM Homologation Emblem, which will remain the property of the Applicant absolutely;
- xi. all use of the FIM Homologation Emblem and Homologation Label by the FIM shall cease upon termination or expiry of this Homologation Manual or the Homologation Notice, unless the Applicant trademark element of the FIM Homologation Emblem is removed therefrom. The FIM shall be entitled to continue to use the remaining elements of the FIM Homologation Emblem after termination or expiry of this Homologation Manual;
- xii. all use of the FIM Homologation Emblem and Homologation Label by the Applicant shall cease upon termination or expiry of this Homologation Manual or the Homologation Notice; the Applicant shall be entitled to continue to use the Applicant trademark only after termination or expiry of this Homologation Manual;
- xiii. The Applicant shall not bring any action in respect of the FIM Homologation Emblem without the prior consent of the FIM.

D. Counterfeiting

Any counterfeiting of the FIM Homologation Label or any FIM material subject to the FIM Intellectual Property Rights arising out in relation with the Homologation Notice constitutes a contractual breach and entitles FIM to claim for damages.

The FIM and the Applicant agree that a close collaboration and an active approach are required to act against counterfeit versions of the FIM Homologation Label.

If the Applicant or the FIM becomes aware that a third party has produced or sold counterfeit versions of the FIM Homologation Label, it shall inform the other party without delay.

If the Applicant becomes aware of counterfeit versions of the FIM Homologation Label, the Applicant may take any measures it sees fit, including without limitation by issuing a warning through different communication channels. The Applicant undertakes to make reasonable endeavours to act at its own cost against counterfeits of the FIM Homologation Labels including without limitation by taking any

practical measures to minimise or eliminate the manufacture, sale, distribution, advertising and/or use of counterfeit versions of the FIM Homologation Label. The Applicant shall inform the FIM of any measures and/or actions it takes accordingly.

If the Applicant has clear and unambiguous evidence that a party has produced or sold counterfeit versions of the FIM Homologation Label, and if the Applicant decides to institute proceedings against that party, it shall inform the FIM at its earliest convenience and provide the FIM with a reasonable time delay for the FIM to consider joining the proceedings as a party.

E. Model Stability

With respect to each Product submitted for homologation, the Applicant undertakes not to modify the following (the list is not exhaustive): for the purposes of the FRHP Application:

- i. the trademark(s)
- ii. the commercial name(s)
- iii. the design
- iv. the materials
- v. the manufacturing process
- vi. dimensions
- vii. components

In addition to the foregoing and without limitation thereof, the Applicant undertakes not to make any changes that generally alter the FIM racing homologated Product Model substantially without the prior written approval of the FIM.

Failure to respect the aforementioned undertakings may lead to immediate withdrawal of the homologation.

If the Applicant wishes to update an existing homologation in order to take into account one or more of the aforementioned items (the list is not exhaustive) it shall send the present Homologation Manual, duly completed and signed, with the requested information and the related documents attached thereto.

Based on this application, the FIM will assess whether the request falls within the scope of an update of an existing homologation or whether a new homologation is required.

F. Testing

The Testing Laboratory will be the sole entity approved to perform the tests in accordance with the present Homologation Manual.

All the homologation tests will be carried out, regardless of whether or not the samples comply with the requirements.

Subject to the availability of the Testing Laboratory and by appointment with the Testing Laboratory, one representative of each Applicant may attend the homologation tests carried out by the Testing Laboratory for its own samples and in absence of other Applicants.

The Testing Laboratory shall issue a Test Report (dated and signed) on the results of the tests performed and send it exclusively to the FIM. Such Test Report shall be sent to the FIM within a period of 2 (two) months after the date of receipt of the Samples. No Test report will be assessed by the FIM if the Application of the Applicant is not complete by this time.

G. Granting of the Homologation

The FIM will check and study the Test Report issued by the Testing Laboratory and is the sole authority having the power to assess it. When the FIM is satisfied that the homologation can be granted, the FIM will inform the Applicant and send a signed Homologation Notice, to be returned to the FIM countersigned by the Applicant. In principle, this Homologation Manual will be sent by the FIM within a month after the date of receipt of Test Report from the Testing Laboratory. The Homologation Notice will notably contain the conditions of use of the Homologation Emblem available for both the Applicant and the FIM. In the case a homologation is updated, an amendment to the existing Homologation Notice will be issued.

The homologation comes into effect only after the FIM has received the Homologation Notice countersigned by the Applicant and once it is signed by the FIM. The Applicant will then be entitled to refer to the homologated Product as "FIM racing homologated" and will be entitled to use the Homologation Emblem in accordance with the FIM's instructions.

In the event that the Product Model does not meet the acceptance criteria and is therefore not granted the FIM Racing Homologation, the Applicant will be informed accordingly through a formal Homologation Refusal.

The FIM may transmit the Test Report to the Applicant upon request.

H. No Assignment

The FIM Racing Homologation shall be binding on and ensure to the benefit of the parties and their respective successors and permitted assigns. The Applicant shall not be entitled to assign or sub-contract its rights or obligations under the Homologation Notice in whole or in part without the prior written consent of the FIM.

I. Labelling

If the homologation is granted, the Applicant will order a certain quantity of Homologation Labels. The only human-eye visible information on the Homologation Label will be the FRHP logo. The rest



of the information will be uploaded on a QR code that is linked to the digital database and can be modified whenever necessary. The QR code carries a unique identification number, which, when scanned, will show the Company name, the Product Model and any other relevant information related to the Product.

The use of Homologation Labels to the Applicant is subject to the prior signature of the Homologation Notice by the Applicant and the FIM.

The Homologation Label shall be firmly glued onto the Product. The Homologation Labels shall not be available outside the Applicant's premises and shall only be fitted by the Applicant or their official agents on the respective homologated Products. For the avoidance of doubt, only Homologation Labels ordered from the FIM shall be used. Each unit of the respective FIM racing homologated Product model which will be manufactured and used/intended for racing must carry the official Homologation Label.

The Applicant undertakes and warrants that it applies the Homologation Label only to Products consistent with the actual Samples submitted to obtain the homologation.

The Homologation Label will be scanned by the FIM, which reserves the right for its officials or the officials of an FMN to remove it, or to remove the Product Model from the digital database, where there are valid reasons to do so.

J. Post-Homologation Controls

The FIM reserves the right to carry out post-homologation control tests on Products selected at random at the production site, at events or via a distribution channel, at any time. It also reserves the right to withdraw the homologation forthwith should the Products subject to random post-homologation controls be found not to be in conformity with the FIM criteria. The Applicant will be notified of the possible non-conformity of the Product.

K. Invoicing

A Homologation fee will be applied by the FIM to the applicant following:

- i. 5000 CHF for homologation for the first homologation
- ii. 2500 CHF for the next homologations
- iii. 1000 CHF for extension of the existing homologation
- iv. 1000 CHF for any update/or a new additional part of the existing homologation
- v. 500 CHF for additional brand name request
- vi. 500 CHF for re-branding

A Homologation Label cost will be applied by the FIM to ensure the viability of the FRHPlp by covering notably the related operational, maintenance and development costs. A net amount of CHF 95.00 (Ninety-five Swiss francs) per label shall be paid by the Applicant.

Payment of the fees and the Homologation Label costs shall be made in full without any set-off, deduction or other withholding whatsoever. For the avoidance of doubt, any possible tax (withholding tax e.g.), duties or charges due on the payment of such fee and Homologation Labels costs shall exclusively be borne by the Applicant. All sums provided for in this Homologation Manual are exclusive of VAT which shall be paid (if applicable) by the Applicant in addition thereto.

In cases where the homologation is granted, the invoice in respect of the Homologation Label cost will be issued together with the Homologation Notice; these shall be respectively paid and signed in due time by the Applicant. The payment of the invoice shall be effected within 30 (thirty) days after receipt and is a condition for valid homologation, without which the homologation can be withdrawn forthwith.

In cases where the homologation is not granted, the only the Homologation Refusal will be issued.

In addition and in any case, the Applicant agrees and acknowledges that a fee will be applied by the Testing Laboratory and charged to the Applicant to cover notably the costs related to the tests requested by the Applicant for each homologation application. The quote related to this fee will be sent to the Applicant by the Testing Laboratory once the Application Form has been validated by the FIM.

Concerning post-homologation controls, if the Product is deemed non-compliant with FIM Product Standard, the FIM will invoice the Applicant the fixed amount of CHF 5'000.- (five thousand Swiss francs). That amount corresponding to the maintenance costs includes notably the costs (if any) of purchasing the Products, the costs of the tests and the administrative costs.

If it is established that if the Product complies with the FIM Product Standard, no costs will be charged to the Applicant.

L. Warranties Regarding Environmental Responsibility and Compliance With Labour, Health And Safety Regulations

The Applicant hereby warrants, represents and undertakes that it has all necessary rights (including but not limited to any intellectual rights), permissions, power and capacity to enter into this Homologation Manual and to perform the obligations deriving from it and, in so doing, is not in breach of any obligations nor duties owed to any third parties and will not be so as a result of performing its obligations under this Homologation Manual.

The Applicant hereby warrants that the manufacture and assembly of the Product takes place in strict compliance with the applicable legislation and regulations applicable to labour, health and safety (including but not limited to Article 32 of the UN Convention on the Rights of the Child) in the

country(ies) in which the Product(s) is/are manufactured or assembled and in the countries in which it conducts business.

The Applicant hereby warrants that it observes the environmental obligations and the provisions of environmental legislation and regulations applicable in the country in which Products are manufactured or assembled and in all countries where it conducts business.

The Applicant hereby certifies that it uses its best efforts to limit emissions and use safe, energy-saving and environmentally friendly technologies in the manufacture and assembly of the Product(s) for which the Application is being made.

M. Indemnities and Liability

The Applicant acknowledges that it has primary and sole legal responsibility for any loss or damage suffered by users and third parties, imputed, directly or indirectly related to the homologated Product of the Applicant.

As the FIM is not involved in any way whatsoever with the manufacturing of the Product, the FIM shall not in any case be liable for any personal injury or property damages related to the use of the Applicant's Product, or any direct, indirect, punitive, special, consequential or incidental loss or damages (whether for loss of profit, loss of business, depletion of goodwill or otherwise caused to the Applicant or third parties arising from any alleged defect(s) related to the Product. In this regard, the Applicant hereby agrees to defend, indemnify, release and hold harmless the FIM, its employees, agents, officials, representatives and volunteers from and against any liability, loss or damage from claims, demands, payments, costs (including attorney's fees and expert fees), investigations, settlements or judgments due to third party claims, whether sounding in product liability, tort, or contract, or due to product recalls, related to alleged defect(s) in the Product.

The Applicant agrees to defend, hold defend, indemnify, release and hold harmless the FIM against all liability, loss, damages from claims, demands, payments, costs, including legal expenses and attorneys' fees, investigations, settlements or judgements arising out of any third-party claims (including but not limited to any intellectual property infringements claims) or allegations related to any breach by the Applicant of its warranties or obligations under this Homologation Manual.

All the warranties and indemnities made under this Homologation Manual shall remain in force indefinitely.

The FIM shall not in any case be liable in contract, tort or otherwise (including any liability for any negligent act or omission) for any direct or indirect, punitive, special, or consequential or incidental loss or damages caused to the Applicant or third parties which may arise from breach or out of or in connection with the FRHPlp. In any event, the FIM's maximum aggregate liability in contract, tort, or otherwise (including any liability for any negligent act or omission) howsoever arising out of or in connection with FIM's obligations to the Applicant under the FRHPlp (e.g. to process the submitted Application Form, open the homologation procedure, assess the Test Report, issue the Homologation Notice or Homologation Refusal within a month of receipt of the Test Report, ship labels on

Applicant's request, send Test Report on Applicant's request) in respect of any one or more incidents or occurrences in the framework of the FIM Racing Homologation shall be limited to a sum equal to the amount of CHF 5'000.- (five thousand Swiss francs). Such exclusion or limitation of liability shall also apply to the personal liability of employees, agents, representatives, officials and volunteers of the FIM.

For the avoidance of doubt, nothing in this Homologation Notice shall limit the liability of the Applicant towards the end-users or to other third parties or shall cap the Applicant's liability to the FIM.

N. Confidentiality

The FIM and the Applicant undertake to keep the terms of the Homologation Manual and Notice strictly confidential.

The FIM undertakes to treat and keep confidential any details provided by the Applicant and not to divulge any information as to testing of the Product Samples, materials used by, or manufacturing processes employed by the Applicant, or any designs, drawings, specifications, or other technical or confidential information as to the Applicant's products or prototypes of products, to anyone without prior written permission of Applicant.

It is understood that the FIM may publish general data derived from testing without disclosing any tradename or Applicant/Supplier identifications.

The FIM's obligation of confidentiality shall be limited in so far as local laws and/or safety considerations and/or instances of counterfeiting may require certain information to be divulged.

The Applicant hereby waives all requirements of confidentiality with respect to its Suppliers and Distributors vis-à-vis the FIM.

Except for promotional purposes as provided for in this Notice, no public announcement shall be made by the Applicant in relation to the FRHPlp without the prior written consent of the FIM.

O. Insurance

The Applicant hereby certifies that it is properly insured against all risks which may arise from or in connection with the Product and that it will at all times maintain an appropriate product liability insurance policy in respect thereof. The Applicant hereby agrees to provide a copy of the policy contracted upon simple request of the FIM.

The Applicant shall maintain at its own expense general and professional liability insurance and public liability insurance for adequate amounts for any one occurrence or series of occurrences arising out of any one event. Such insurance policies shall include cover in respect of product liability insurance for third party claims, and for the indemnification of the Applicant's obligations under the Homologation Manual and Notice.

The Applicant undertakes and warrants that it shall not do anything or omit to do anything that may affect the validity and/or compromise the applicability of any insurance coverage referred to in this Homologation Manual.

P. Withdrawal

Without this giving rise to any indemnity whatsoever, any decision will not give rise under any circumstances to any claim against the FIM from the Applicant. The FIM may immediately and without notice (in addition to and not in substitution for any of its other rights and remedies under this Homologation Manual or in law) withdraw the FIM Racing Homologation granted to the Applicant in the following cases:

- i. where the Product submitted for homologation no longer meets the (new and/or amended) standards required for entry and/or the acceptance criteria as defined by the FIM (see inter alia Section **VI CONTRACTUAL TERMS AND CONDITIONS, J. Post-Homologation Controls** above);
- ii. where any conduct (e.g. act or omission, behaviour, public statement, etc.) whatsoever on the part of the Applicant, his management, employees, representatives or agents, which causes or may cause any prejudice (e.g. any direct or indirect or consequential loss or damages (whether for loss of profit, loss of business, depletion of goodwill or otherwise and including but not limited to any damage to property or death or injury)) to the FIM or its reputation;
- iii. in the event that the Applicant commits a breach of any of its obligations under this Homologation Manual.

Q. Consequences of Withdrawal

Upon withdrawal of the FIM Racing Homologation:

- i. all of the rights granted by the FIM in the framework of the FRHPlp (including those granted under this Homologation Manual) shall forthwith terminate and, where applicable, automatically revert to the FIM;
- ii. the Applicant shall not use or exploit its previous connection with the FRHPlp, whether directly or indirectly;
- iii. all sums due and payable to the FIM by the Applicant at the date of withdrawal of the FIM Racing Homologation shall be paid immediately together with any accrued interest on the same;
- iv. in the event that the withdrawal of the FIM Racing Homologation arises from non-payment by the Applicant of any sum due under this Homologation Manual, the FIM shall, without prejudice to any other rights under this Homologation Manual or law, be entitled to receive the balance then outstanding of the total Homologation Fee and Homologation Labels costs

as set out in Section **VI CONTRACTUAL TERMS AND CONDITIONS, .K. Invoicing** of this Homologation Manual;

- v. the Applicant shall not have any right to any indemnity or payment of compensation or damages;
- vi. the FIM may make a public announcement regarding the withdrawal of the FIM Racing Homologation.

If the FIM Racing Homologation is withdrawn by the FIM pursuant to Section **VI. CONTRACTUAL TERMS AND CONDITIONS, P Withdrawal** above, the Applicant shall be required to pay the FIM a penalty in the amount of CHF 5'000.- (five thousand Swiss francs). The penalty is payable even if the FIM has not suffered any loss or damage.

Furthermore and in any case of withdrawal of the FIM Racing Homologation, the FIM is entitled to recover from the Applicant any losses and damages as may be allowed under the law.

To apply for re-homologation for a withdrawn Product Model, the Applicant should follow the normal application process. The application will be treated as a new submission.

R. Waiver

Failure or neglect by either party to enforce at any time of the provisions hereof shall not be construed nor shall be deemed to be waiver of either party's rights hereunder nor in any way affect the validity of the whole or any part of this Homologation Notice nor prejudice either party's rights to take subsequent action.

S. Announcement

No announcement shall be made by the Applicant in relation to the FRHPlp without the prior written consent of the FIM.

T. Transparency

The Applicant has a duty of transparency and disclosure towards the FIM as the homologating body.

Any sporadic or regular malfunction or sporadic or systemic defect affecting the Product that arises at any time shall immediately be reported to the FIM and remedial measures proposed. Where necessary, the homologation will be withdrawn.

U. Severability

If any provision of this Homologation Notice shall be held to be invalid, illegal or unenforceable, then both parties shall be relieved of all rights and obligations arising under such provision and such provision shall be modified to the extent necessary to make it valid, legal and enforceable whilst



preserving the intent of the parties. All other provisions of this Homologation Notice shall be regarded as fully valid and enforceable unless otherwise proved.

V. Termination

The Applicant may withdraw its Application and terminate the FIM Homologation Manual and Notice upon written notice to the FIM before the grating of the FIM Racing Homologation or upon at least thirty (30) days' notice once the Homologation is granted.

Either party (the Applicant or the FIM) may terminate this Homologation Notice with immediate effect upon written notice to the other party if at least one of the following conditions is met:

- i. if the other party is dissolved (other than pursuant to a consolidation, amalgamation or merger);
- ii. If the other party becomes insolvent or is unable to pay its debts or fails or admits in writing its inability generally to pay its debts as they become due;
- iii. if the other party seeks or becomes subject to the appointment of an administrator, provisional liquidator, conservator, receiver, trustee, custodian or other similar official for it or for all or substantially all its assets;
- iv. if the other party has a secured party take possession of all or substantially all its assets or has a distress, execution, attachment, sequestration or other legal process levied, enforced or sued on or against all or substantially all its assets and such secured party maintains possession, or any such process is not dismissed, discharged, stayed or restrained, in each case within thirty (30) days thereafter; or
- v. if the other party causes or is subject to any event which, under the applicable laws of any jurisdiction, has an analogous effect to any of the events specified in clauses *i* to *iv* inclusive above (of this Section **VI CONTRACTUAL TERMS AND CONDITIONS., V**).

W. Termination Consequences

Upon termination of the FIM Homologation Manual and Notice:

- i. all of the rights granted by the FIM in the framework of the FRHPlp (including those granted under the Homologation Manual and Notice) shall forthwith terminate and, where applicable, automatically revert to the FIM;
- ii. the Applicant shall not use or exploit its previous connection with the FRHPlp, whether directly or indirectly;
- iii. all sums due and payable to the FIM by the Applicant at the date of termination of the FIM Racing Homologation shall be paid immediately together with any accrued interest on the same;
- iv. in the event that the termination of the FIM Racing Homologation arises from non-payment by the Applicant of the FIM Racing Homologation fees and payable amounts, the FIM shall, without prejudice to any other rights under this Homologation Notice and Manual or law, be entitled to receive the balance then outstanding of the total Homologation fee and the Homologation Label;

- v. the Applicant shall not have any right to any indemnity or payment of compensation or damages.
- vi. the Applicant shall immediately surrender to the FIM all the unused FIM Homologation Labels and any other materials or documents issued to it pursuant to this Notice.
- vii. the FIM may make a public announcement regarding the termination of the FIM Homologation

The termination of the Homologation Notice and Manual will not under any circumstances give rise to any liability on the part of FIM to pay any compensation to the Applicant, including but not limited to, for loss of profits or goodwill.

X. Notices

Any notice given under the Application shall be in writing and signed by authorised representatives on behalf of the party giving it and shall be sent by hand, prepaid recorded or special delivery post, courier, fax and/or email, marked for the attention of the relevant party and to the address and/or number set out below:

In the case of the Applicant:

To the Address, email and telephone indicated in the Application.

In the case of the FIM:

Attention of:	FIM Racing Homologation Programme responsible
	Route de Suisse 11
	CH-1295 Mies
	Suisse
Email:	frhp@fim.ch
Fax N°:	+41 22 950 95 00

Y. Applicable Law and Arbitration

Any dispute arising from or in connection with the FRHP (including the validity or interpretation of this Homologation Manual) shall be governed by and interpreted exclusively in accordance with Swiss law and shall be submitted exclusively to the Court of Arbitration for Sport (CAS) and resolved definitively in accordance with the Code of Sports-related Arbitration in force on the date on which the Request for Arbitration is submitted.

The Panel shall consist of one arbitrator, which shall be independent of the Parties and appointed in accordance with the Code of Sports-related arbitration of the CAS. The seat of the arbitration shall be Lausanne (Switzerland). The arbitral proceedings shall be conducted in English.

The Expedited Procedure shall apply to the arbitration proceedings including to the provisional and super-provisional measures. The time-limit with respect to the designation of an arbitrator shall be 15 (fifteen) days. If the circumstances so justify, the Panel may extend or shorten the above time-limit.

Notwithstanding the above, the parties may agree at any time to submit the dispute to mediation in accordance with the CAS Mediation Rules.

Furthermore, the Applicant may not seek damages or take action to gain compensation for any inconvenience or other loss incurred. Finally, any decision to withdraw the FIM Racing Homologation will have immediate effect and the stay of its execution will not be entertained in any circumstances by the CAS Panel and cannot therefore be submitted to arbitration.

The Applicant confirms that he has read and agreed to the present Homologation Manual. In particular, the undersigned Applicant confirms that he is cognisant with and accepts the Term and Conditions contained in this Homologation Manual.

Applicant's representative

Name	Signature
------	-----------

On ____/____/____

Note: Please initial each page in the dedicated boxes

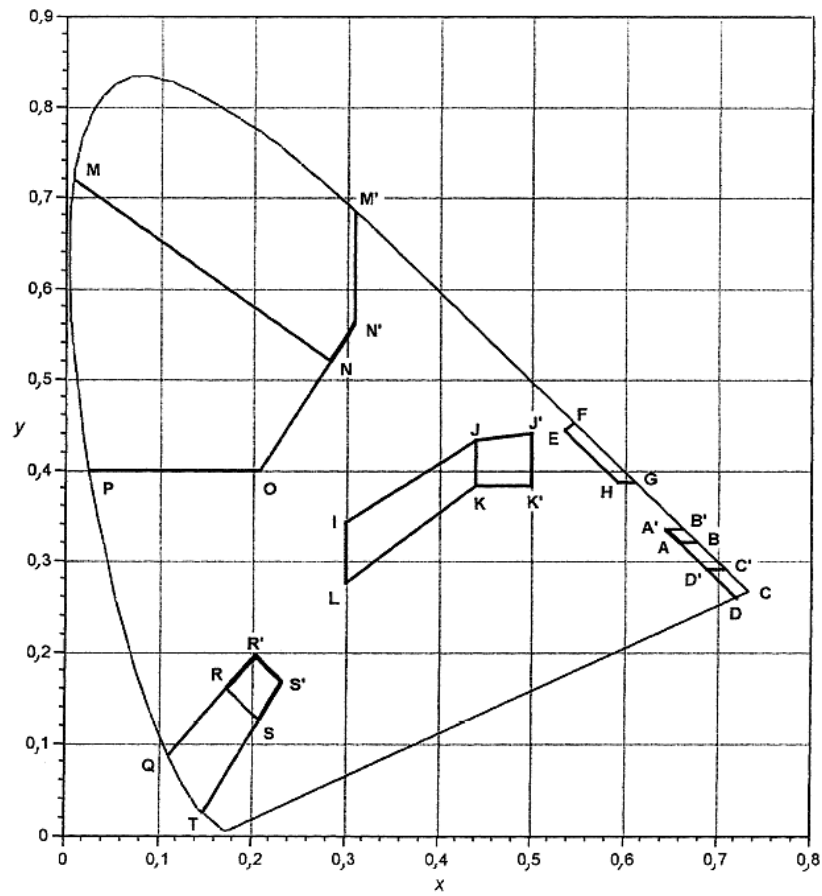
VII. APPENDIX 1: CHROMATICITY COORDINATES

Coordinates of intersection points of allowed chromaticity area boundaries

COLOUR		CHROMATICITY COORDINATES				
RED LIGHT SIGNAL COLOURS CLASS A ³	X	A	B	C'	D'	
	Y	0,66	0,68	0,71	0,69	
WHITE LIGHT SIGNAL COLOURS CLASS A ³	X	I	J	K	L	
	Y	0,32	0,32	0,29	0,29	
GREEN LIGHT SIGNAL COLOURS CLASS A ³	X	M	N	O	P	
	Y	0,01	0,28	0,21	0,03	
BLUE LIGHT SIGNAL COLOURS CLASS A ³	X	Q	R	S	T	
	Y	0,72	0,52	0,40	0,40	
YELLOW LIGHT SIGNAL COLOURS CLASS FIA 1	X	SY1	SY2	SY3	SY4	SY5
	Y	0,11	0,17	0,21	0,15	
ORANGE LIGHT SIGNAL COLOURS	X	0,09	0,16	0,13	0,03	
	Y	0,454	0,480	0,545	0,521	0,500
	X	E	F	G	H	
	Y	0,486	0,519	0,454	0,440	0,440
	X	0,57	0,61	0,54	0,51	
	Y	0,43	0,39	0,38	0,41	

Table 3: Chromaticity coordinates

³ Persons with defective colour vision are included in the user group



UNECE R48 Extract:

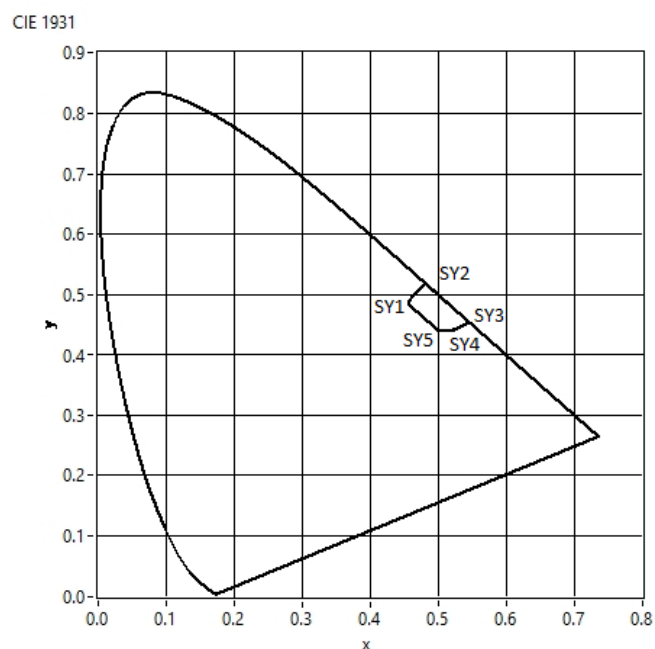
"Selective-yellow" means the chromaticity coordinates (x,y)⁴ of the light emitted that lie inside the chromaticity areas defined by the boundaries:

SY12 green boundary	$y = 1.290 x - 0.100$
SY23 the spectral locus	
SY34 red boundary	$y = 0.138 + 0.580 x$
SY45 yellowish white boundary	$y = 0.440$
SY51 white boundary	$y = 0.940 - x$

With intersection points:

	X	Y
SY1	0.454	0.486
SY2	0.480	0.519
SY3	0.545	0.454
SY4	0.521	0.440
SY5	0.500	0.440



















⁴ CIE Publication 15.2, 1986, Colorimetry, the CIE 1931 standard colorimetric observer

















Further information can be found on the UNECE website:

<http://www.unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/2015/R048r12e.pdf>

VIII. APPENDIX 2: FLAGS DISPLAY MODE

Flag Type	Current Design(s)	RECOMMENDED FLASHING FREQUENCY (Hz)
Yellow		2
Double Yellow		2 - 4
White		2
Green		2
Blue		2
Red		2
Slippery surface		Static
Safety Car	 	2
Virtual Safety Car*	 	2
Full Course Yellow*		2
Code 60*		Static - 2
Pit Entry		Static
Pit Entry Closed		Static
Custom Blue		2
Standing/Rolling Start	 	2

Mechanical Problem	 	2 - 3
Unsportsmanlike behaviour	 	2- 3
Black	 	2 - 3
Chequered		2
Next Slow*	  	2
Slow Zone*	  	2
Rain FIM		Static
Rain + Slippery FIM	To de defined	

* *Specific flags included in the software for FIA events*

Please note some specific settings for FIM championships events in appendix 3

VIII. APPENDIX 3: LIGHT PANEL INFORMATION – FIM WORLD CHAMPIONSHIP

The following appendix has been prepared to outline the requirements for FIM World Championship event light panel systems.

These guidelines are for Manufacturers and Circuits to follow when installing systems for the 2022 season onwards. Under all circumstances the FIM Safety Officers of World Championship concerned must be kept up to date with the installation process and any queries should be directed to him.

Up to this current version, the information panel (start/finish line position) had no homologation process.

For a light panels system already homologated, the specifications of the information panel, in this appendix must be adhered to and are considered a minimum. This panel will be manufacturer certified, as a new part, but can be checked at any time by the FIM and their promoters. Note that information panels must be from the same supplier as the circuits chosen light panel supplier and operated from the same software.

For a first application of a light panel system, the information panel must be part of the application.

All light panel systems used for FIM Championship events must be homologated to FIM standards, grade 1 or 2.

Note that “system” includes the operating software. If the software is not from the Manufacturer of the FIM-homologated system, this must be advised to, and approved in advance by the FIM and FIM Safety Officer (this is to ensure that all functions, connections and access to Championship Race Control systems are available).

Additional requirements maybe requested depending on the circuit i.e. Marshal/Operator briefings or specific panel configurations (linked). Detailed information on these aspects will be provided.

A. General operating considerations

Light panel positions must follow the FIM Safety Officers requests. The Safety Officers reserves the right to relocate light panels.

Control box positions must follow the FIM Safety Officers requests. Light Panel Controllers need to be positioned to have full visibility of their sector (From their LED to the next LED). This may mean Controllers are not positioned at existing flag post positions. The Safety Officer reserves the right to relocate control box positions.

Manufacturers must create a FIM World Championship (FIM WC) profile for all signals used at FIM World Championship events. It should not be possible for flag marshals or Race Control operatives to select an incorrect signal not associated to FIM World Championship.

In addition to the circuit operating system/software, the Race Direction must have access to the light panel operating software during live sessions in the form of a second user. This second user must be able to adjust light panel signals and/or information panel signals.

Flag marshal signals must be overwritable by Race Control.

Flag marshals must **not** be able to remove Race Controls signals. They must **only** have the ability to overwrite Race Control signals with Yellows/Double Yellows in situations where Race Control may have sent a lower priority signal (Green/Black/Mechanical/etc)

When a LED Panel has been activated with a Yellow/Double Yellow, the following LED must automatically activate the Green Flag and remain active for 5 seconds after the Yellow/Double Yellow has been removed.

The software must have the ability to remove all of a specific flag. For example, in situations where there are both Yellow Flags and Black Flags active, we need the ability to remove all Black Flags without removing the Yellow Flags.

The Black Flag & Mechanical Flag must be available to use on all LED Panels - not just the Information Panel.

Light panels must have a link function where two panels (or more) can be operated by one controller.

Light panels must have a feature where two panels can be linked but only when one of the panels is activated. For example, if LED 2 is displaying a Yellow, then LED 1 will automatically replicate this.

This will be used in situations for turns where safety requires two Panels to be Yellow, having this feature saves time by being automatic and not waiting for a marshal or Race Control to copy. LED 1 will still work as normal; this would just be an additional feature.

It is essential that server settings i.e. time and date etc are correct and monitored before and during a FIM World Championship event.

Light panel minimum height requirements, as outlined by FIM/FIA must be followed. For panels mounted trackside, 2.5m from verge/track to underside of light panel. Panels placed on overhead gantries, should where possible, be mounted 5m to the underside of the panel.

Replacement light panels must be available in case of damage or technical failure.

Light Panel signals must be displayed flashing and flash rates must be adjustable (between 1Hz to 4Hz).

Marshal controllers must have the following signals available – Green, Yellow, Double Yellow, Surface/oil (yellow and red striped), Blue and Rain (white with diagonal red cross). All other signals must only be activated from Race Control.

Recommended installation poles are shown in paragraph E. Please ensure light panels can change location if required, as well as tilt and pivot in their positions.

B. Information Panel Hardware:

- Minimum dimensions: 1500mm x 1000mm (W x H)
- Panel Brightness: minimum 6000 cd/m²
- Viewing angle: 120 degrees (V x H)

*Note these are minimum requirements for the information panel, any specifications above these quoted are accepted.

C. Information Panel Text Display:

Change Position Penalty and Time Penalty will only display a single rider number (See fig A). **All should be available from a pre-set list.**

FIM World Championship penalty information (ride through, Stop & Go, Long Lap, LLP X2, Equipment and Warning) must be displayable on the information panel. In conjunction with this written penalty, 4 x double digit rider numbers must be displayable (See fig B). **All should be available from a pre-set list.**

FIM World Championship procedural information (start delayed, Rain on grid etc) must be displayable on the information panel (See fig C). **All should be available from a pre-set list.**

All messages must be displayable in flashing and/or static text.

Text fonts must be adjustable.

Customizable text messages.

Adjustable countdown clock with display of 5 min, 3 min, 1 min and 30 sec.

Fig A:

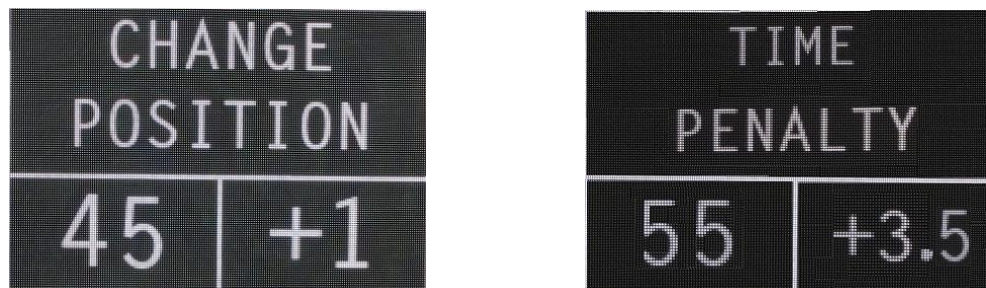


Fig B:

LLP X2
11

RIDE THROUGH
11
33

RIDE THROUGH	
11	33
55	

LONG LAP	
11	33
55	99

STOP & GO	
11	33
55	

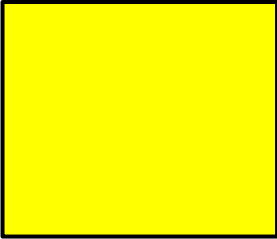
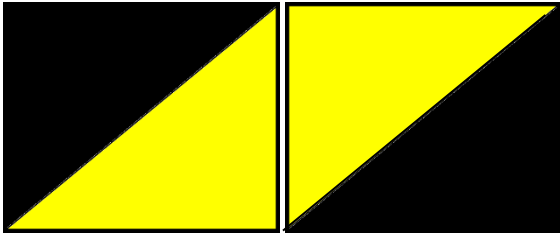
WARNING	
11	33
55	


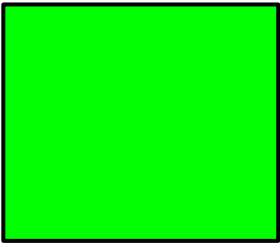
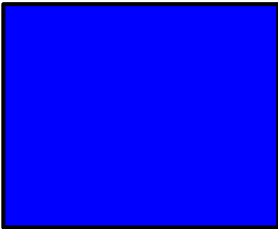
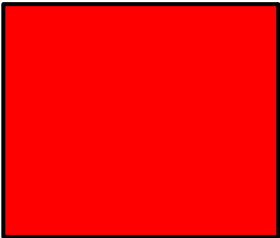

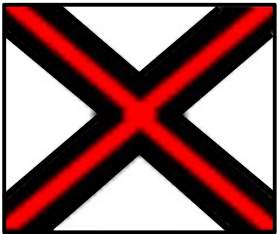
EQUIPMENT
11

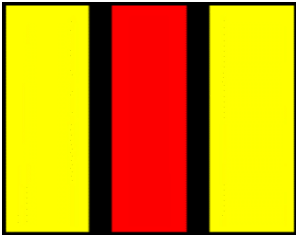
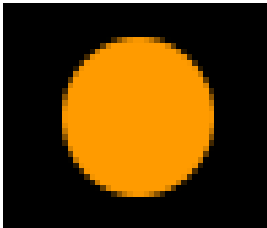
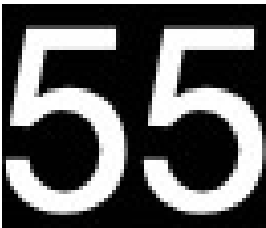
Fig C:



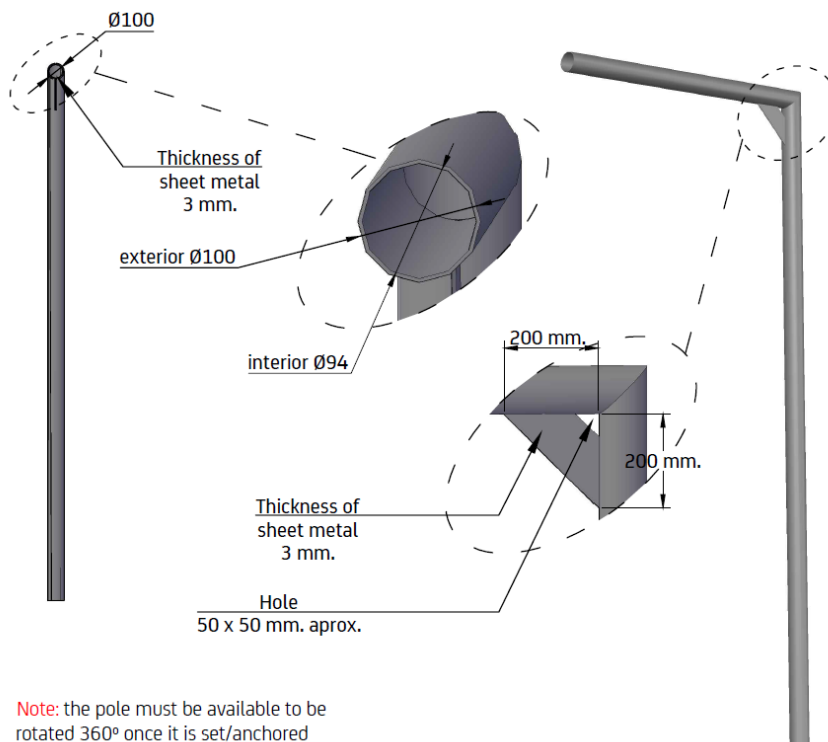
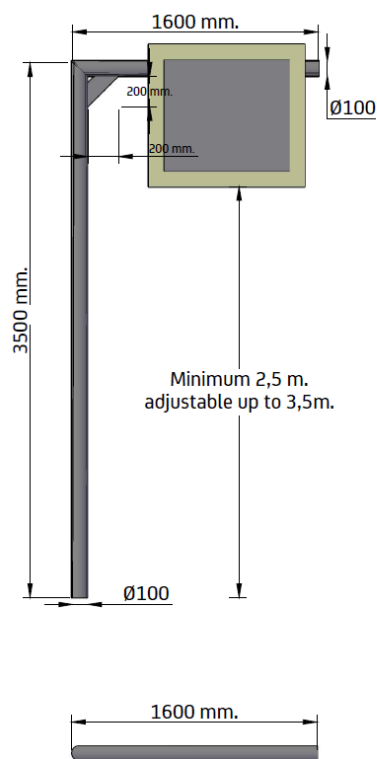
D. Light Panel Flag Signals - FIM World Championship 2022 – Specific settings for events

<div>Yellow Flag</div> <div>*Flag marshal controlled</div>		<div>Flashing</div> <div>(1-4Hz)</div>
<div>Double Yellow Flag</div> <div>*Flag marshal controlled</div>		<div>Flashing</div> <div>(1-4Hz)</div>

White Flag		Flashing (1-4Hz)
Green Flag *Flag marshal controlled		Flashing (1-4Hz)
Blue Flag *Flag marshal controlled		Flashing (1-4Hz)
Red Flag		Flashing (1-4Hz)
Black Flag		Flashing (1-4Hz)
White Flag with Diagonal Red Cross *Flag marshal controlled		Flashing (1-4Hz)

<p>Yellow and Red Striped Flag</p> <p>*Flag marshal controlled</p>		<p>Flashing (1-4Hz)</p>
<p>Black and Orange Flag</p>	 	<p>Flashing (1-4Hz)</p>

E. Light Panels Mounting pole:



Note: the pole must be available to be rotated 360° once it is set/anchored depending on the needs.