

# 2019 TECHNICAL REGULATIONS

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Series:

**IMSA WEATHERTECH SPORTSCAR CHAMPIONSHIP**

Class:

**GRAND TOURING LE MANS**

Sanctioned by:

**INTERNATIONAL  
MOTOR SPORTS  
ASSOCIATION**

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## Foreword:

For all Members, the IMSA RULES of the International Motor Sports Association establish the foundation for the organization and conduct of all IMSA Sanctioned Events. The IMSA RULES take effect immediately upon publication.

The purpose of the RULES is to: (i) promote safety, the sport of automobile Competition and IMSA, (ii) enhance Competition, (iii) ensure the quality, fairness and integrity of the IMSA programs and operations and (iv) achieve prompt finality in the Competition results (“**Purpose**”).

### **ALL MEMBERS ARE REQUIRED TO REVIEW THESE IMSA RULES CAREFULLY.**

The **IMSA RULES** consist of following three (3) sections and the Event Supplementary Regulations (**SR**):

- The Technical Regulations, which outline the rules and regulations for the specific cars and equipment. The Technical Regulations may be modified or changed at any time by the publication of a Technical Bulletin, amending the Technical Regulations.
- The IMSA Sporting Regulations (**ISR**), which concern Competitor and Event procedures, as well as guidelines for the safe and uniform operation of the sport. The ISR may be modified or changed at any time by the publication of a Competition Bulletin, amending the ISR.
- The Series Supplementary Regulations (**SSR**) that provides Series-specific information about each IMSA Series. The SSR is integrated into the ISR and are designated with “(SSR)” next to the Paragraph title. The SSR may be modified or changed at any time by the publication of a Competition Bulletin, amending the SSR.

Any portion of the RULES may be modified through Bulletins (Competition Bulletins and Technical Bulletins, respectively) and takes force when published. Once published, the Bulletin shall take precedence over the applicable portion of the RULES. Additionally, the RULES may be modified for an Event by the Race Director through the mandatory briefing instructions.

### **HOW TO READ THE RULES**

- 1) These Technical Regulations are a Permissive document. Unless specifically defined as permitted, any modification, change, or adjustment is inherently prohibited. This philosophy is more clearly defined in Article 4 and specific modifications are clearly defined in Article 9.
- 2) The Technical Regulations are specific to particular categories, classes and types of race cars in a Series. Where the Technical Regulations conflict with the ISR or the SSR, the Technical Regulations shall govern.
- 3) The SR is specific to an Event and published in conjunction with the Event schedule. Where SR conflicts with the ISR, SSR, and/or Technical Regulations, the SR shall govern.

## EXECUTIVE LEADERSHIP MASTHEAD

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## ARTICLE 1. DEFINITIONS SPECIFIC TO THE TECHNICAL REGULATIONS

- 1.1.1. **Car** means a singular representation of a Car Model possessing a Technical Credential, entered by an Entrant in an Event.
- 1.1.2. **Car Model** means a specific model of a vehicle constructed by an IMSA-recognized Manufacturer Partner, and intended for Competition.
- 1.1.3. **Class** means a category for Cars sharing a common set of Homologation Regulations and differentiated from others by type of Car Model.
- 1.1.4. **Competition** means a contest of competitive nature in which a Car takes part during an Event and results of which Competition are published.
- 1.1.5. **Constructor** means an entity that designs and builds race car chassis.
- 1.1.6. **Entrant** means an entity or person who has entered a Car that has been accepted for Competition and holds an IMSA Membership in the capacity of an Entrant or Entrant/Driver.
- 1.1.7. **Event** means an IMSA Sanctioned motorsport activity. It includes the designated Race as well as all periods for registration, inspections, practice Sessions, qualifying Sessions, racing, pre- and post-Race activities and inspections, and rain or postponed dates related thereto.
- 1.1.8. **Homologate** means to execute the Homologation Process.
- 1.1.9. **Homologated** means a Car Model approved through the Homologation Process.
- 1.1.10. **Homologation** means the concept of all things associated with Homologation Authority approval via the Homologation Process.
- 1.1.11. **Homologation Authority** means an entity with the authority to Homologate.
- 1.1.12. **Homologation Documentation** means all files, documents, information, and communication associated with the issuance of official approval of Homologation.
- 1.1.13. **Homologation Identifier** means the unique identifier (generally including a string of characters identifying the Category or Class of Homologation followed by a sequential number assigned to the Car Model) serving as a reference to the official approval of Homologation, assigned by the Homologation Authority.
- 1.1.14. **Homologation Process** means all procedures associated with petitioning a Homologation Authority for approval that a Car Model complies with the Homologation Regulations.
- 1.1.15. **Homologation Regulations** means a set of technical requirements and criteria used to design, construct, and document a Car Model intended for racing in a specific category or class of racing.
- 1.1.16. **Manufacturer** means a Manufacturer Partner constructing an approved Car Model.
- 1.1.17. **Manufacturer Partner** means a recognized IMSA Official Automotive Partner.
- 1.1.18. **Permissive** means modifications explicitly authorized by these Technical Regulations are permitted and modifications not explicitly authorized by these Technical Regulations are prohibited.
- 1.1.19. **Specification** means all technical characteristics of the Car Model defined by the Homologation and Technical Credential.
- 1.1.20. **Specific Homologation** means the Homologation specific to a particular Car Model.
- 1.1.21. **Specific Technical Credential** means the Technical Credential specific to a particular Car Model.
- 1.1.22. **Technical Credential** means the concept of all things associated with IMSA approval via the Technical Credential Process.
- 1.1.23. **Technical Credential Documentation** means all files, documents, information, and communication associated with the Technical Credential Process.
- 1.1.24. **Technical Credential Identifier** means the unique identifier that serves as a reference to the Technical Credential granted by the IMSA. Example: IMSA GTLM 20170101 [GTE-0XX].
- 1.1.25. **Technical Credential Process** means all procedures associated with petitioning IMSA for approval that a Car Model is Technically Eligible.

- 1.1.26. **Technical Eligibility Form** means the form which documents the Specific Technical Credential.
- 1.1.27. **Technically Eligible** means conforms to all technical requirements and criteria defined by these Technical Regulations.

## ARTICLE 2. TECHNICAL PHILOSOPHY

### 2.1. Technical Eligibility

- 2.1.1. Car Models Technically Eligible for participation in IMSA Events are issued a Technical Credential Identifier.
- 2.1.2. Cars representing a Car Model must always respect the Specification.
- 2.1.3. To be issued a Technical Credential Identifier for participation in this Class, a Car Model must:
  - a. Be a Car Model constructed by an IMSA-recognized Manufacturer Partner.
  - b. Hold a valid Homologation conforming to the Homologation Regulations and Homologation Documentation specific to the Class, approved and issued by an IMSA-recognized Homologation Authority.
  - c. Successfully complete the IMSA Technical Credential Process.
- 2.1.4. IMSA is the sole authority to define the Technical Eligibility of a Car Model and issue the Technical Credential.

### 2.2. Balance of Performance Adjustment

- 2.2.1. To maintain competitive equivalency between Cars within the Class, and between Classes, IMSA uses the Balance of Performance process as outlined in Article 6 to mandate adjustments to the Specification.
  - a. Performance is evaluated using observed performance data; including, but not limited to, the IMSA Scrutineering data logger and official Timing and Scoring.

### 2.3. Changes

- 2.3.1. Changes to the Specification are prohibited, unless explicitly authorized by IMSA.
- 2.3.2. Manufacturers alone must petition IMSA to change the Specification; requests by Entrants are not recognized.

## ARTICLE 3. USING THESE TECHNICAL REGULATIONS

### 3.1. Structure

- 3.1.1. These Technical Regulations are structured to assist Manufacturers and Entrants in accurate interpretation of the technical expectations and enforcement of the IMSA Technical Philosophy.
  - a. A brief description of each Article and its purpose follows:

Article / Name	Description / Purpose
1. Definitions Specific to the Technical Regulations	Standardized meanings for specific terms of these Technical Regulations.
2. Technical Philosophy	Guiding principles for these Technical Regulations.
3. Using These Technical Regulations	General structure, purpose, and clarifying statements for these Technical Regulations.
4. Homologation	Pertinent topics related to Homologation.
5. Technical Eligibility	Pertinent topics related to Technical Eligibility.
6. Balance of Performance	General processes associated with competitive equivalency.
7. Safety	Regulatory requirements associated with mandatory safety systems.
8. Definition of Class	Statement of specific Class, Homologation, and Technical Eligibility requirements.
9. Series Required Electronics	Regulatory requirements associated with mandatory electronic systems.
10. Vehicle Systems	Approved modifications to the Homologation component of the Car Model Specification.
11. Refueling System	Regulatory requirements associated with specified refueling system.

### 3.2. Conflict Resolution

- 3.2.1. These IMSA Technical Regulations shall govern in any case where a conflict exists with the Homologation Regulations and Documentation.

### 3.3. Final Authority

- 3.3.1. IMSA is the Final Authority with respect to these Technical Regulations.

## ARTICLE 4. HOMOLOGATION

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### 4.1. Homologation Regulations

- 4.1.1. Reference to the official Homologation Regulations defining the requirements applicable to these Technical Regulations is provided in ARTICLE 8. DEFINITION OF CLASS.

### 4.2. Homologation Process

- 4.2.1. The procedures of the Homologation Process are used to verify that the Car Model meets the necessary requirements and criteria defined by the official set of Homologation Regulations.
- 4.2.2. This process generally includes the following components or phases, which must be completed to the satisfaction of the Homologation Authority:
- a. Homologation Files and Documentation
  - b. Homologation Inspection
  - c. Homologation Testing
  - d. Final Approval
  - e. Identification Assignment
- 4.2.3. Homologation Process fees may apply.

### 4.3. Homologation Files and Documentation

- 4.3.1. All files and documents required by the Homologation Authority to support the Homologation Process; including but not limited to:
- a. Basic Homologation Form
  - b. Homologation Extension Form(s)
  - c. Data Sheet(s)
  - d. CAD Models and Drawings
  - e. Logged Vehicle Data
  - f. Homologation Testing Data
- 4.3.2. Basic Homologation Form: Documents how the Car Model complies with the Homologation Regulations; including photographs, drawings, descriptions, and measurements defining the characteristics, components, parameters, and/or dimensions and tolerances for:
- a. General Vehicle
  - b. Specific Vehicle Systems
  - c. System Assemblies, Parts and Components
  - d. Modifications to the Original Series Production Car (if applicable)
- 4.3.3. Homologation Extension Forms: Describe all approved modifications made to the Basic Homologation Form, including but not limited to modifications for:
- a. Correction of incorrect information
  - b. Safety reasons
  - c. Reliability reasons
  - d. Evolutions of type introduced on the original Car Model (if applicable)
  - e. Evolutions for new components and/or characteristics that cancel and replace those featured in the original Basic Homologation Form
  - f. Variant options, such as endurance packages

- 4.3.4. CAD Models and Drawings: As required by the Homologation Authority to support the Homologation Process; including but not limited to:
  - a. Complete Vehicle CAD Models
  - b. Specific Component CAD Models
  - c. Specific Component Drawings
  - d. Engine Air Intake Restrictor(s)
- 4.3.5. Homologation Testing Data: Information, documentation, data, and results from Homologation Testing.

#### 4.4. Homologation Inspection

- 4.4.1. The inspection process for drawings, CAD models, any reference component, and the constructed Car Model by the Homologation Authority.
  - a. These inspections confirm that a Car Model complies with the Homologation Regulations and are generally conducted as part of the following phases of the Homologation Process:
    - i. Design
    - ii. Construction
    - iii. Final Approval

#### 4.5. Homologation Testing

- 4.5.1. Any testing conducted by the Homologation Authority to support the Homologation Process; including, but not limited to:
  - a. Straight-line Testing
  - b. Wind Tunnel Testing
  - c. Engine Dyno Testing
  - d. Track Testing

#### 4.6. Homologation Identifier

- 4.6.1. The Homologation Identifier is electronically stamped/associated with all information, documentation and files associated with the Homologation.

#### 4.7. Conditions for Use of a Specific Homologation

- 4.7.1. At all times during IMSA-sanctioned Events it is the Entrant's responsibility to ensure the configuration of the Car Model represents the Homologation components of the Specification; including:
  - a. As-Homologated Configuration
  - b. As-Delivered Configuration
  - c. Parts Manual
  - d. Homologation Extension Form Configuration
- 4.7.2. The original, As-Homologated Configuration of the Car Model must not be modified unless permitted by these Technical Regulations.
- 4.7.3. The As-Delivered Configuration of a Car must respect the as-received configuration from the Car Model Manufacturer, unless permitted by these Technical Regulations.
- 4.7.4. The Parts Manual is the official parts catalogue for the Car Model as defined by the Car Model Manufacturer or Constructor:
  - a. Specific parts listed in the Parts Manual must be used on all representations of a Car Model unless permitted by these Technical Regulations.
- 4.7.5. To be eligible for use in any IMSA-sanctioned Event, modifications detailed in Homologation Extension Forms must:
  - a. Comply with these Technical Regulations.
  - b. Be approved by, or have initiated the process to obtain approval from, the Homologation Authority, and appended to the Car Model Homologation.
  - c. Be approved by IMSA
  - d. Be available to all Entrants of the relevant Homologated Car for the next Event.

## ARTICLE 5. TECHNICAL ELIGIBILITY

### 5.1. Technical Credential Process

- 5.1.1. Manufacturers may begin the Technical Credential Process for a Car Model provided the Car Model:
  - a. Holds, or have initiated the process to obtain approval from, a valid Homologation as defined in these Technical Regulations.
  - b. Is approved by IMSA.
- 5.1.2. The procedures of the Technical Credential Process are used to verify that the Car Model meets the necessary requirements and criteria defined by these Technical Regulations.
- 5.1.3. This process generally includes the following components or phases, which must be completed to the satisfaction of IMSA:
  - a. Technical Credential Files and Documentation
  - b. Technical Eligibility Testing
  - c. Final Approval
  - d. Identification Assignment
- 5.1.4. IMSA may request Manufacturers submit reference components to support the Technical Credential process.
  - a. IMSA may retain these components without compensation.
- 5.1.5. IMSA may request Manufacturers submit reference tooling and/or templates to support the Technical Inspection process.
- 5.1.6. Technical Credential fees may apply.

### 5.2. Technical Credential Files and Documentation

- 5.2.1. All files and documents required by IMSA to support the Technical Credential Process; including but not limited to:
  - a. Technical Eligibility Form
  - b. Data Sheet(s)
  - c. CAD Models and Drawings
  - d. Logged Vehicle Data
  - e. Electronic Controller Calibrations
  - f. Technical Eligibility Testing Data
- 5.2.2. Technical Eligibility Form: Documents how the Car Model complies these Technical Regulations; including:
  - a. List of all files and documentation associated with the Specific Homologation of the Car Model
  - b. List of all files and documentation associated with the Specific Technical Credential of the Car Model
  - c. All approved IMSA-Only Declarations
- 5.2.3. CAD Models and Drawings: As required by IMSA to support the Technical Credential Process; including but not limited to:
  - a. Complete Vehicle CAD Models
  - b. Specific Component CAD Models
  - c. Specific Component Drawings
  - d. Additional components requested by IMSA
- 5.2.4. Technical Eligibility Testing Data: Information, documentation, data, and results from Technical Eligibility Testing.

### 5.3. Technical Eligibility Testing

- 5.3.1. Any testing conducted by IMSA to support the Technical Credential Process; including, but not limited to:
  - a. Restrictor Flow
  - b. Engine Dyno
  - c. Wind Tunnel
  - d. On-track Testing
  - e. Fuel Delivery Testing
  - f. Fuel Consumption Testing

#### 5.4. Technical Credential Identifier

- 5.4.1. The Technical Credential Identifier is electronically stamped/associated with all information, documentation and files associated with the Technical Credential.

#### 5.5. Conditions for Use of Specific Technical Credential

- 5.5.1. At all times during IMSA-sanctioned Events it is the Entrant's responsibility to ensure the configuration of the Car Model represents the approved Technical Credential components of the Specification.

### ARTICLE 6. BALANCE OF PERFORMANCE

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#### 6.1. Balance of Performance

- 6.1.1. IMSA may, at its discretion, utilize an adjustment method to maintain competitive equivalency between Cars within each Class, and between Classes.
- 6.1.2. All decisions by IMSA regarding Balance of Performance are Conclusive and not subject to protest or appeal.
- 6.1.3. Providing false or intentionally misleading information is a breach of these Technical Regulations.

#### 6.2. Criteria for Adjustments

- 6.2.1. Performance is evaluated using observed performance data; including, but not limited to, the IMSA Scrutineering data logger and official Timing and Scoring.
- a. IMSA may omit from consideration any data not indicative of the established performance of the Car Model.

#### 6.3. Adjustment Parameters

- 6.3.1. The following adjustments may apply:
- a. Minimum mass
- b. Engine restrictor and/or boost ratio change
- c. Maximum fuel capacity
- d. Aerodynamic elements and/or settings
- e. Other parameters as designated by IMSA

#### 6.4. Release of Adjustments

- 6.4.1. IMSA may release Balance of Performance adjustments at any time during the season.
- 6.4.2. All adjustments take effect seven (7) days after publication except in the case of Events on consecutive weekends.

### ARTICLE 7. SAFETY

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#### 7.1. Driver Safety Harness System

- 7.1.1. Cars must be equipped with a minimum 6-point Driver safety harness with a valid label demonstrating compliance with one of the following standards:
- a. FIA Standard 8853/98: FIA Safety Harnesses Standard
- i. [FIA Technical List #24](#): Harnesses Homologated by the FIA according to the FIA Standards 8853/98 and 8854/98
- b. FIA Standard 8853-2016: Safety Harnesses
- i. [FIA Technical List #57](#): Harnesses Homologated according to the FIA Standard 8853-2016
- c. SFI Specification 16.5: Stock Car Driver Restraint Assemblies
- i. [Specification](#)
- ii. [Manufacturers](#)

- d. SFI Specification 16.6: Advanced Motorsport Driver Restraint Assemblies
  - i. [Specification](#)
  - ii. [Manufacturers](#)
- 7.1.2. Installation must be performed in accordance with instructions provided by the system supplier and/or manufacturer.
  - a. Belt components must be installed at each anchor point to prevent accidental release or opening.
  - b. Individual belt straps must be independent; any method or attempt to combine individual straps is prohibited.
  - c. Elastic retention straps are prohibited on shoulder belts.
- 7.1.3. Harnesses must be replaced at the request of IMSA, or whenever the following conditions occur:
  - a. Expiration:
    - i. FIA Homologated: Immediately following December 31<sup>st</sup> of the year printed on the label.
    - ii. SFI Certified (punched/cut label): Two years from the date as stated on label. If label is not properly “cut” by the manufacturer or their representative, the date for expiration shall be January 1<sup>st</sup> of the earliest year printed on the label + two years.
    - iii. SFI Certified (non-punched label): On June 30<sup>th</sup> or December 31<sup>st</sup>: of the year identified as the date for expiration.
  - b. Damage:
    - i. Following a severe collision.
    - ii. Webbing is cut or frayed, or weakened due to actions of chemicals or sunlight.
    - iii. Buckles are bent, deformed, rusted, or improperly functioning.
- 7.1.4. Entrants are responsible for ensuring the Driver safety harnesses and all associated components are properly labeled, installed, used, and maintained.
- 7.1.5. Belt components must be used as designed by the manufacturer and tested by SFI or FIA. It is prohibited to “mix” belt components to include:
  - a. Belt components from different manufacturers.
  - b. Belt components certified by SFI and FIA.

## 7.2. Seat

- 7.2.1. As homologated.

## 7.3. Driver Containment Nets

- 7.3.1. Cars must be equipped with center, and Driver-side containment nets with a valid label demonstrating compliance with one of the following:
  - a. FIA Standard 8863-2013: Racing Nets
    - i. [FIA Technical List #48](#): Racing Nets Homologated according to the FIA Standard 8863-2013
  - b. SFI Specification 37.1: Roll Cage Nets
    - i. [Specification](#)
    - ii. [Manufacturers](#)
- 7.3.2. Installation requirements:
  - a. Supplier and/or manufacturer installation instructions must be respected.
  - b. Horizontal webbing must be oriented towards the Driver.
  - c. When secured at anchor points, nets must be:
    - i. Oriented parallel to the Car centerline.
    - ii. Located with minimal gap to the Driver’s helmet.
  - d. Signage or equipment may be attached to nets provided:
    - i. The designed purpose of the net is respected.
    - ii. Visibility over and/or through the net is unobstructed.

- 7.3.3. Containment nets must be replaced prior to the expiration date:
- a. FIA Homologated: Immediately following December 31<sup>st</sup> of the year printed on the label.
  - b. SFI Certified (punched/cut label): Two years from the date as stated on label. If label is not properly “cut” by the manufacturer or their representative, the date for expiration shall be January 1<sup>st</sup> of the earliest year printed on the label + two years.
  - c. SFI Certified (non-punched label): On June 30th or December 31<sup>st</sup>: of the year identified as the date for expiration.

#### 7.4. Protective Padding

- 7.4.1. Cars must be equipped with non-flammable protective padding with a valid label demonstrating compliance with one of the following standards:
- a. FIA Standard 8857-2001: FIA Roll Cage Padding Standard
    - i. [FIA Technical List #23](#): Roll Cage Padding Homologated by the FIA
  - b. SFI Specification 45.1: Roll Cage Padding
    - i. [Specification](#)
    - ii. [Manufacturers](#)
- 7.4.2. Installation requirements:
- a. Padding must be located to protect the Driver (body and/or helmet) against direct contact with the safety cage in a collision.
  - b. Protective padding must be securely affixed to prevent rolling or displacement.

#### 7.5. Protective Shielding

- 7.5.1. Cars may be equipped with shielding to protect the Driver against contact with cockpit equipment in a collision.
- 7.5.2. Installation requirements:
- a. Installations must not impact cockpit exit.
  - b. Installations of protective shielding must use fire-resistant materials and if impact padding is used it must comply with FIA 8857-2001, SFI 45.1 or SFI 45.2.
  - c. Installations must be presented to and approved by IMSA at time of technical inspection.

#### 7.6. Master Electrical Switches

- 7.6.1. As homologated.
- 7.6.2. Systems must remain functional during any on track activity or at the request of IMSA.
- 7.6.3. Interior and exterior master switches must be clearly identified by a self-reflective symbol of a red spark surrounded by a white-edged, blue triangle with a base greater than 30 mm.

#### 7.7. Fire Suppression System

- 7.7.1. Cars must be equipped with a fire extinguisher system with a valid label demonstrating compliance with one of the following standards:
- a. FIA Standard for plumbed-in Fire Extinguisher Systems in Competition Cars (1999):
    - i. [FIA Technical List #16](#): Extinguisher Systems Homologated by the FIA
  - b. FIA Standard 8865-2015: Plumbed-in and Hand-Held Fire Extinguisher Systems
    - i. [FIA Technical List #52](#): Plumbed-in Fire Extinguisher Systems according to FIA Standard 8865-2015
  - c. SFI Specification 17.1: On Board Fire Suppression Systems
    - i. [Specification](#)
    - ii. [Manufacturers](#)

- 7.7.2. Extinguishing media must be compatible with all aspects and accessories of the fire suppression system.
  - a. Compliance with FIA 8865-2016 is recommended.
  - b. All system components must be used and serviced per manufacturer specifications.
- 7.7.3. System must be securely mounted.
  - a. The following must be visible without the use of photography, tools, or seat removal:
    - i. Pressure gauge (if present)
    - ii. Date of manufacture
    - iii. Next required service date
  - b. Nozzles must not point directly at the Driver's face.
- 7.7.4. System must include an exterior activation mechanism proximal to the exterior master electrical switch at (or near) the base of the left side A-Pillar.
  - a. Exterior activation mechanism must be located such that emergency responders may activate with a single action:
    - i. Using a gloved finger, or tools such as a hook.
    - ii. Unencumbered by bodywork, windshield wipers, or any equipment that may require multiple actions.
  - b. A method for preventing activation of the exterior activation mechanism:
    - i. May be enabled when the Car is in Technical Inspection, in the Paddock, or located near large crowds, such as during pre-Race activities.
    - ii. Must be removed prior to participation in on-track activity.
- 7.7.5. Identification
  - a. Exterior activation mechanism must be marked with a self-reflective symbol with a red edge surrounding a red "E" inside a white circle at least 100 mm in diameter.
  - b. The interior fire activation switch, located in cockpit, must be marked with an appropriately sized decal of a red "E" inside a white circle.
- 7.7.6. Inspection
  - a. IMSA may require removal of the fire bottle for Technical Inspection.
  - b. Entrant is responsible to demonstrate proper system function of the interior and exterior fire suppression activation mechanisms, using the "test" mode if present.

## ARTICLE 8. DEFINITION OF CLASS

### 8.1. Grand Touring Le Mans (GTLM)

- 8.1.1. Class Structure: Grand Touring Le Mans Cars compete in the GTLM Class of the IMSA WeatherTech Sportscar Championship (IWSC).
- 8.1.2. Eligibility Requirements: To be eligible for participation in the Class, a Car Model must respect the Specification defined by the Homologation and Technical Eligibility requirements:
  - a. Homologation:

<b>Homologation Authorities:</b>	Federation Internationale de l'Automobile (FIA) / Automobile Club de l'Ouest (ACO) International Motor Sports Association (IMSA)
<b>Homologation Specification:</b>	FIA Le Mans Grand Tourisme Endurance (LM GTE)
<b>Homologation Regulations:</b>	<a href="#">FIA 2018 Technical Regulations for Grand Touring Cars (LM GTE) – Homologated from 2016 – HOMOLOGATION REQUIREMENTS AND CRITERIA</a>
<b>Additional Documentation:</b>	<a href="#">FIA 2018 Technical Regulations for Grand Touring Cars (LM GTE) – Homologated from 2016</a>

## ARTICLE 9. VEHICLE SYSTEMS

### 9.1. General

- 9.1.1. All Vehicle Systems and associated sub-systems are listed in this Article.
  - a. Where change to the Homologated Vehicle Systems is permitted, regulatory text is **bold and underlined**.
  - b. Where change to the Homologated Vehicle Systems is prohibited, regulatory text is *light grey*.
  - c. Advisory statements are in normal text.

### 9.2. Modifications to the Specification

- 9.2.1. Entrants may execute the following changes to parameters defined by the Homologation component of the Car Model Specification, provided these Technical Regulations, all current Technical Bulletins, and the Technical Credential are fully respected:
  - a. Adjust component settings defined as adjustable.
  - b. Replace components with parts defined as optional.
- 9.2.2. Manufacturers must make any declarations listed in these Technical Regulations in the Technical Eligibility Form.
- 9.2.3. Further authorization to modify the Specification and/or As-Delivered Condition is granted via the following formal communication methods:
  - a. Published IMSA Technical Bulletin
  - b. Approved updates to the IMSA Technical Eligibility Form
- 9.2.4. Informal and/or verbal communication is not considered valid authorization.

### 9.3. Servicing, Repair, and Replacement

- 9.3.1. All servicing or repair must be made in good faith to restore the Car and all components to their originally intended form and function as defined by the Specification.
- 9.3.2. Entrants may replace damaged or worn components provided these Technical Regulations are respected.

### 9.4. Dimensions

- 9.4.1. General
  - a. IMSA's **calibrated** measurement instruments are the official measurement instruments.
  - b. **Scrutineering measurement(s) are taken with the applicable dry-type tire set installed.**
    - i. **Tire compound per the applicable Event SR.**
  - c. **Tire pressure shall be set at 30.0 psi ( $\pm 0.5$  psi) for scrutineering measurement(s).**
- 9.4.2. Reference Surface
  - a. The flat floor reference surface of the Car is measured to the plane of the Technical Inspection surface plate.
- 9.4.3. Mass
  - a. The minimum mass for all Car Models is defined via Balance of Performance Tables and associated Technical Bulletins.
  - b. Car mass is measured as-raced minus Driver and Fuel using the IMSA scales during Technical Inspection.
- 9.4.4. Ballast
  - a. **Entrants may add or remove ballast to achieve minimum mass:**
    - i. Ballast must be in plate or panel form.
    - ii. Addition or removal of ballast during the race is prohibited.
  - b. **Entrants using Cars without specific Homologated locations must:**
    - i. Locate all ballast inside the cockpit in the passenger's location.
    - ii. Secure all ballast per FIA Article 253-16 in both dimensions and characteristics of fixation methods.
    - iii. Design fixations such that tools are required for its removal.

#### 9.4.5. Ground Clearance

- a. The minimum ground clearance for all Car Models is defined via Balance of Performance Tables and associated Technical Bulletins.
- b. Ground Clearance is measured across the complete underside of the Car Model during Technical Inspection.

#### 9.4.6. Overall Dimensions

- a. Length
- b. Width
- c. Height
- d. Wheelbase
- e. Track
- f. Overhang
- g. Width

### 9.5. Chassis

#### 9.5.1. General

- a. **Entrants may execute minimum modifications for the installation of components.**
  - i. All modifications must be approved by IMSA.

### 9.6. Driver Interface

#### 9.6.1. General

- a. **Entrants may install a driver hydration system.**
  - i. Installations must be approved by IMSA.
  - ii. System must not serve any additional purpose.

#### 9.6.2. Steering Wheel

- a. **Entrants may add, and/or modify the shape of, steering wheel grips.**

#### 9.6.3. Pedal Box

- a. **Entrants may apply non-slip adhesives to the surface of driver pedals.**

#### 9.6.4. Shifting Mechanism

#### 9.6.5. Driver Adjustable Components

#### 9.6.6. Driver Cooling Systems

### 9.7. Bodywork

#### 9.7.1. General

- a. **Entrants may install the following film to the front windscreen:**
  - i. Tear-offs
  - ii. Anti-fog

#### 9.7.2. Bodywork Seams

- a. **Entrants may apply tape over the body seams around refueling receptacles.**

#### 9.7.3. Decals

- a. **Entrants may apply removable die cut sponsorship decals with the approval of IMSA.**

#### 9.7.4. Headlights

## 9.8. Aerodynamic Elements

### 9.8.1. General

### 9.8.2. Splitter

### 9.8.3. Dive Planes

### 9.8.4. Body Gurney

### 9.8.5. Wings

- a. The main plane adjustment range may be restricted as defined via Balance of Performance Tables and associated Technical Bulletins.

### 9.8.6. Rear Wing Gurney

- a. The rear wing gurney height for all Car Models may be defined via Balance of Performance Tables and associated Technical Bulletins.

### 9.8.7. Floor

### 9.8.8. Friction Blocks

### 9.8.9. Diffuser

## 9.9. Engine System

### 9.9.1. General

- a. Manufacturer seals must be respected

### 9.9.2. Engine

### 9.9.3. Lambda

- a. The minimum lambda value for all Car Models is defined via Balance of Performance Tables and associated Technical Bulletins.

### 9.9.4. Engine RPM

- a. The maximum engine RPM limits for all Car Models are defined via Balance of Performance Tables and associated Technical Bulletins.
- b. The RPM limit is considered exceeded when either of these conditions occur:
  - i. Engine RPM exceeds RPM limit for more than 250 ms, and actual pedal position is greater than 60% of the maximum
  - ii. Engine RPM is more than 1.0% over RPM limit for more than 100 ms, and actual pedal position is greater than 60% of the maximum, i.e. an 8000 RPM limit is exceeded when RPM is greater than 8080 for more than 100 ms while actual pedal position is greater than 60%.

### 9.9.5. Intake

- a. The assigned inlet air restrictor diameter(s) for all Car Models is defined via Balance of Performance Tables and associated Technical Bulletins.
  - i. All air entering the engine must pass through the restrictor.
- b. Intake air restrictors are sealed by IMSA Technical Officials during Pre-Event Technical Inspection.
  - i. Entrants must receive approval from IMSA to remove seals following inspection, and seals must be replaced by IMSA Technical Officials prior to on-track activity.
- c. **Manufacturers may declare an alternative air filter via the Technical Eligibility Form**
  - i. Declared filter must be approved by IMSA in writing at least seven (7) days before first use.
  - ii. Entrants must use the manufacturer declared air filter.

### 9.9.6. Exhaust

9.9.7. Turbo

9.9.8. Engine Control Unit (ECU)

9.9.9. Engine Transportation Crate

- a. Entrant must have immediately available a crate sufficient to securely and safely package and ship an engine.

## 9.10. Boost Management

9.10.1. Maximum Boost Pressure

9.10.2. Boost Pressure Ratio

- a. The table of maximum boost pressure ratio versus engine RPM for applicable Car Models is defined via Balance of Performance Tables and associated Technical Bulletins:

- i. All values between the tabulated set points defined via the table are interpolated linearly.

9.10.3. Boost Control Strategy Inputs

Parameter	Description	TB*
Maximum Boost Pressure Ratio (Max Pboost Ratio)	Curve of Maximum Boost Pressure Ratio as a function of Engine RPM	TB
Actual Boost Pressure (Pboost)	Intake manifold pressure measured in accordance with these Technical Regulations In case of two separate intake manifolds, the average of the two manifold pressure sensors will be referenced	
Filtered Boost Pressure (Pboost Filtered)	Exponentially weighted moving average of Actual Boost Pressure. Defined as: $(P_{boost\ Filtered})_n = (P_{boost})_n * (C_{eFit}) + (P_{boost\ Filtered})_{n-1} * (1 - C_{eFit})$	
Filter Coefficient (CeFit)	Coefficient that defines weighting for Filtered Boost Pressure	
Barometric Pressure Reference	Absolute barometric pressure reading will be recorded by IMSA's calibrated barometer at noon on setup day of a race event The official reading will be promptly released in a Technical Bulletin and is in effect for the remainder of the event	TB
Actual RPM	Unfiltered RPM value measured in accordance with these Technical Regulations	
Actual Throttle	Engine throttle position measured in accordance with these Technical Regulations In case of two engine throttles, the maximum value of the two throttle positions is referenced	
RPM Threshold	An RPM threshold which is used as a condition	
Resultant Boost	$(P_{boost\ Filtered}) - (Barometric\ Pressure\ Reference) * (Max\ Pboost\ Ratio)$	
Integral	Area under the Resultant Boost as a function of time curve in units of pressure-time	
Integral Time Step	Time step of the Integral	
Integral Decay	A value in units of pressure-time subtracted from the Integral when the integral is positive	
Low Overboost Level	A lower overboost limit in units of pressure time	
Lower Overboost Counter	A counter which is incremented when the Low Overboost Level is met or exceeded Low Overboost Counter limits must never be exceeded	
Low Overboost Counter Reset Condition	A time-based condition that will reset the Low Overboost Counter	
High Overboost Level	A maximum overboost limit in units of pressure-time that can never be met or exceeded	

\* All parameters indicated with TB are defined via Technical Bulletin.

Session Classification	RPM Threshold	Throttle Threshold	Integral Time Step	Integral Decay	Filter Coefficient	Low Overboost Level	High Overboost Level	Low Overboost Counter Limit	Low Overboost Counter Reset Conditions
	[RPM]	[%]	[s]	[mb*s]		[mb*s]	[mb*s]		
Qualifying	2000	25	0.001	5	0.1718	30	100	1	Crossing Start/Finish Timing Loop, Crossing Pit-In Timing Loop, Crossing Pit-Out Timing Loop
All Other Sessions	2000	25	0.001	5	0.1718	30	100	5	Crossing Pit-In Timing Loop, Crossing Pit-Out Timing Loop

#### 9.10.4. Calculation Method

- a. Resultant Boost is integrated over time at each time step at a rate equal to Integral Time Step when:
  - i. [(Actual RPM) >= (RPM Threshold)] AND [(Actual Throttle) >= (Throttle Threshold)] AND [(Resultant Boost) > 0]
  - ii. The current Integral value is added to the initial Integral value
- b. The Integral Decay is subtracted from the Integral when Resultant Boost < 0
  - i. This value is always positive
  - ii. (Integral) – (Integral Decay) >= 0
- c. A Low Overboost Counter is incremented if:
  - i. (Integral) >= (Low Overboost Level)
- d. It is a violation of the boost regulations if either:
  - i. The Low Overboost Counter Limit is exceeded
  - ii. (Integral) >= (High Overboost Level)
- e. The Integral is reset to zero (0) if:
  - i. [(Actual RPM) <= (RPM Threshold)] OR [(Actual Throttle) <= (Throttle Threshold)]
- f. The Integral value is held in memory as an initial condition for the next time step.

#### 9.10.5. Low Overboost Counter Usage Limitation

- a. Automated or driver-initiated control strategies used for competitive advantage that result in Low Overboost counters are not permitted.
  - i. Examples include push-to-pass and overtake buttons.

### 9.11. Drive System

#### 9.11.1. General

- a. Manufacturer seals must be respected

#### 9.11.2. Fluids & Lubricants

- a. **Unrestricted.**

#### 9.11.3. Clutch

#### 9.11.4. Gearbox

#### 9.11.5. Gears

- a. A gear set consists of the following ratios, and must always be used in its entirety:
  - i. 6 forward ratios
  - ii. 1 reverse ratio
  - iii. 1 final drive ratio
  - iv. 1 drop gear (if applicable)
- b. **In addition to the FIA Homologated gear set, Manufacturers of new homologations accepted by IMSA may declare two (2) additional gear sets via the Technical Eligibility Form by December 1<sup>st</sup>, 2018:**
  - i. Daytona Only Gear Set
  - ii. Short/Street Circuit Gear Set

#### 9.11.6. Gearbox Control Unit

#### 9.11.7. Differential

#### 9.11.8. Axles

#### 9.11.9. Uprights

## 9.12. Cooling System

### 9.12.1. General

### 9.12.2. Fluids

- a. **Entrants may utilize non-glycol based fluids.**

### 9.12.3. Inlet Blockers

- a. **Entrants may utilize the following methods for the sole purpose of blocking off portions of the cooling system inlet openings:**

- i. Opaque adhesive tape.
- ii. Panels made from carbon fiber and/or aluminum with associated fastener hardware.

### 9.12.4. Water System

### 9.12.5. Oil Cooling System

## 9.13. Fuel System

### 9.13.1. General

- a. Maximum Capacity

- i. The maximum fuel capacity for all Car Models is defined via Balance of Performance Tables and associated Technical Bulletins.
- ii. The maximum fuel capacity is the total volume of fuel contained in the Car.

### 9.13.2. Fuel Types

- a. Manufacturers must declare the fuel type, supplied by VP Fuels, via the Technical Eligibility Form.
- i. IMSA may require a fuel sample for inspection via a gas chromatograph.

### 9.13.3. Fuel Cell

- a. **Entrants may use blocks or balls to achieve maximum fuel cell capacity:**

- i. Any device, system, or procedure designed to increase, even temporarily, the total fuel storage capacity beyond the maximum is prohibited.
- b. Any configuration of the homologated design intended to decrease the minimum refueling time below the minimum time listed in the class specific BoP table is prohibited.

### 9.13.4. Fuel Lines

### 9.13.5. Fuel Sample Port

- a. **Entrants must equip the Car with the approved self-sealing connector for extraction of fuel samples:**

- i. Approved Connector: Staubli P/N: CBI06.7251/IA/JKV.
- ii. Must be located immediately before the injector nozzles.
- iii. Installation must be approved by IMSA.

### 9.13.6. Refueling Receptacle

## 9.14. Brake System

### 9.14.1. General

### 9.14.2. Fluids & Lubricants

- a. **Unrestricted.**

### 9.14.3. Bias Assembly

### 9.14.4. Master Cylinders

### 9.14.5. Brake Lines

9.14.6. Calipers

9.14.7. Rotors

9.14.8. Pads

- a. **Friction material is unrestricted.**
- b. Backing Plates must be ferrous.

9.14.9. Ducting

9.14.10. Brake Duct Inlet Blockers

- a. **Entrants may utilize the following methods for the sole purpose of blocking off portions of the brake duct inlet openings:**
  - i. Opaque adhesive tape.
  - ii. Panels made from carbon fiber and/or aluminum with associated fastener hardware.
  - iii. Must be fixed.

9.14.11. Anti-Lock Braking System

## 9.15. Steering System

9.15.1. General

9.15.2. Fluids & Lubricants

- a. **Unrestricted.**

## 9.16. Suspension System

9.16.1. General

9.16.2. Geometry Elements

9.16.3. Springs

- a. **Entrants may change primary spring rates:**
  - i. The As-delivered number of springs per wheel must be respected.

9.16.4. Dampers

- a. **Entrants may change the damper internal build:**
  - i. Inerter technology is prohibited.

9.16.5. Bump Rubbers and Packers

- a. **Unrestricted.**

9.16.6. Anti-Roll Bar

9.16.7. Third Elements

## 9.17. Wheels & Tires

9.17.1. General

9.17.2. Wheels

9.17.3. Wheel Attachment

9.17.4. Tires

- a. **Manufacturers must declare tire supplier and tire compounds in the Technical Eligibility Form.**

## 9.18. Electronics

### 9.18.1. General

### 9.18.2. Data Logger

- a. **Entrants may install a data acquisition system where not included in the As-delivered Car.**
- b. IMSA reserves the right to download and/or view all logged data at any time.

### 9.18.3. Telemetry

- a. **Entrants may utilize one-way telemetry systems for data acquisition purposes.**

### 9.18.4. Wiring Loom

### 9.18.5. Sensors

### 9.18.6. Radio

- a. **Entrants may install one (1) primary, and one (1) secondary, two-way voice communication radio with car-to-pit communication capability:**
  - i. Radio(s) must comply with Series Sporting Regulations.
  - ii. Secondary radio must not transmit or receive signals while primary radio is functional.

### 9.18.7. Rear View Camera

- a. **Where not homologated, Entrants may install a rear-view camera system.**

### 9.18.8. Auxiliary Power Sources

- a. Manufacturers must obtain IMSA approval to install or utilize auxiliary power sources.

## ARTICLE 10. SERIES REQUIRED ELECTRONICS

### 10.1. Series Scrutineering Data System

10.1.1. Cars must be equipped with the IMSA Scrutineering Data System at all Events.

- a. The manual for the Scrutineering Data System for the Class is the Bosch Scrutineering Systems Manual (BSSM), available on the IMSA Competitor site:
  - i. Bosch Scrutineering System Manual version 1.4.5.
- b. Scrutineering system components must be purchased from, or supplied by, the approved sources listed in the BSSM.

10.1.2. The system consists of a combination of the following as specified by IMSA:

Part Number	Item
F02U.V0U.207-01	Bosch C60 Data Logger
F02U.B00.435-01	Bosch MM5.10 5-axis Inertial Measurement Unit
F02U.V0U.150-01	Bosch LT2 Sport Lambda Sensor Controller
F02U.V0U.203-01	GPS Unit
F02U.V0U.204-01	1 Bar Pressure Sensor
F02U.V0U.205-01	3.5 Bar Pressure Sensor
F02U.V0U.206-01	Temperature Sensor
F02U.V01.342-01	USB Stick
F02U.002.996-01	USB Data Storage Device Port
AS112-35SM	MSA Diagnostic/Communication Port
F02U.V0U.206-01	Cockpit Temperature Sensor
0258.988.001	LSU 4.9 Lambda Sensor
1804-00-020	Gill Oil Catch Tank Level – Sourced from Gill Sensors
Provided by IMSA	Backup Transponder
Entrant Supplied	Wiring Loom
RG.DV.PV0099	Leader Light System
ET-100-01	Fuel Flow Sensor
Manufacturer Specific	Engine Speed Sensor

- a. The scrutineering system and all its components are standalone and intended for IMSA use.

10.1.3. All components of the Scrutineering System must remain powered during on-track sessions, and pit stops.

10.1.4. Entrants must complete a [IMSA Scrutineering Sensor Declaration Form](#) no later than 24 hours before load-in day of every Event.

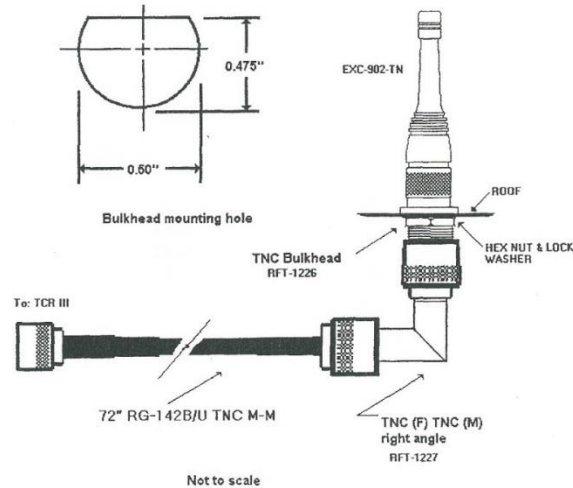
10.1.5. Scrutineering system components and sensors must be installed per the Car Model's Scrutineering Homologation document.

- a. IMU unit must be:
  - i. Aligned within 1 degree of centerline of Car.
  - ii. Aligned within 0.5 degrees of horizontal.
- b. Fuel Flow Sensor must have a valid calibration for the entire duration of all IMSA Sanctioned Events.
  - i. Fuel Flow Sensor calibration expires at 150 hours of run time.
  - ii. Entrants are responsible for monitoring the calibration time remaining. A cumulative run time counter CAN channel is provided to the Entrant from the IMSA Scrutineering Logger.
- c. All other antennas on Car must be installed at least 250 mm from IMSA GPS Receiver.

- d. Wiring loom must be:
  - i. Consistent with IMSA approved Car Models Scrutineering Homologation document
  - ii. Provided by the Entrant.
  - iii. Independent of any other system.
  - iv. Removable.
  - v. Verified and serialized before Entrant participates in their first event of each season, per the Loom Certification outlined in the BSSM.
  - vi. Certifications are only valid for the season they are issued.
  - vii. Available for additional testing when requested by IMSA.
- 10.1.6. CAN channels must be configured per the applicable DBC file posted in the regulation section of competitors.imsa.com.
  - a. Entrants must provide CAN channels from the ECU, chassis logger, or equivalent device per the CAN specification detailed in the BSSM.
  - b. CAN communication to the IMSA Scrutineering Logger must be transmitted directly from the device of origin, and not repeated through a 3<sup>rd</sup> party device.
    - i. Example: Engine RPM must be transmitted directly from the ECU to the IMSA Scrutineering Logger, and not through the chassis logger.
  - c. Scrutineering sensors take precedence over CAN provided values from the ECU or chassis logger.
  - d. Scrutineering sensor outputs are provided to the Entrant over a Public CAN bus.
- 10.1.7. Series Scrutineering Data System inspection and data collection requirements are:
  - a. Entrants must present all series mandated data collection media to the IMSA Technical Inspection trailer within thirty (30) minutes of the completion of each session.
  - b. Series Scrutineering Data Logger must be installed and tested prior to Technical Inspection.
    - i. Entrant may be required to install USB Stick during inspection process at the direction of series officials.
  - c. Any repair to the looms must be approved by Bosch Motorsport and re-certification through Bosch Motorsport may be required.
- 10.1.8. Scrutineering system primary component units must have an IMSA Scrutineering Seal.
  - a. Each device ordered through Bosch Motorsport NA using the order form found in the Scrutineering System Manual will be delivered with the seal in place.

## 10.2. Safety Light System

- 10.2.1. Cars must be equipped with the Delphi Yellow Light Kit to indicate active flag status.
  - a. The Kit contains the following components:
    - i. Yellow Indicator Light
    - ii. Mounting Bracket
    - iii. Antenna
    - iv. Wiring Loom and Instruction
- 10.2.2. The Safety Light system must be installed and functioning during on-track activity.
  - a. The Yellow Indicator Light must be prominently installed within the cockpit, in clear line of sight of the driver.
  - b. Antenna Installation: The supplied antenna must be mounted:
    - i. On the Car roof
    - ii. Away from other antennae
    - iii. Following the diagram below (a ground plane is not required):



- c. Wiring Loom Installation: The Wiring Loom has a flying lead input for +12 VDC and Ground to interface with additional wiring referenced in the installation instructions.
  - i. Entrants must supply additional wiring as required.

- 10.2.3. An activating receiver is available from IMSA during Safety Checks at each Event and remains the property of IMSA.
  - a. Entrants must surrender the receiver when required by IMSA.
  - b. A lost or damaged receiver is subject to a replacement fee referenced in the IMSA Accessories form.

### 10.3. Driver ID System

- 10.3.1. Cars must be equipped with a Driver ID system to identify the active Driver piloting the Car.
- 10.3.2. Driver ID plugs must be installed and connected per the BSSM.
- 10.3.3. Transponder and plugs must be tested and operate to the satisfaction of the Timing and Scoring Officials.

### 10.4. X2 Transponder System

- 10.4.1. Cars must be equipped with the X2 Transponder System Kit (Qty 1) to transmit scrutineering data from the car
  - a. X2 Transponder Kit contains the following component(s):
    - i. Transponder.
    - ii. Isolation Mounts.
- 10.4.2. X2 transponder may be purchased via the IMSA Accessories Order Form.
- 10.4.3. Transponder system must be installed, as per Car Model's Scrutineering Homologation documentation, and functioning during Events.
  - a. Must be installed with appropriate thermal protection where the temperature cannot exceed 50 °C

### 10.5. Leader Light System

- 10.5.1. Cars must be equipped with LED leader light panels.
  - a. IMSA Leader Lights are available from Motec USA ( [https://www.milspecwiring.com/IMSA-WeatherTech-Leader-Light-Panel\\_p\\_2255.html](https://www.milspecwiring.com/IMSA-WeatherTech-Leader-Light-Panel_p_2255.html) )
- 10.5.2. Leader light system must be installed and functioning during Events.
  - a. Leader lights must be installed and connected to the Scrutineering System loom per the Car Model's Scrutineering Homologation document.

## 10.6. Back-lit Panel

- 10.6.1. Cars must be equipped with white light-emitting side number panels for Races taking place partly by night.
- Colored background must be cut out in the number shapes so they are illuminated during the night.
  - White light-emitting side number panels are supplied by Entrants.

## 10.7. Pro-Am Light

- 10.7.1. Not applicable.

## 10.8. In-Car Camera

- 10.8.1. Cars may be required to carry In-Car-Cameras (ICC).
- Entrants must cooperate with the official broadcaster in the installation of the camera, including the provision of power for the equipment.
    - May require a battery pack.
  - Cars must mount an actual ICC, or the ICC replacement dummy unit, on their roof, and must:
    - Be mounted opposite side of centerline of the Car from the Driver
    - 12.5" rearward of the trailing edge of the windshield
    - 4.5" off the centerline of the roof
    - Or as approved by IMSA
  - ICC replacement replica unit must be purchased from RPXpress (Phone: +1-828-428-0820 Email: [lmcelwain@rpxpress.com](mailto:lmcelwain@rpxpress.com))
  - Cars equipped with ICC must display the Car number in the ICC's home position field of vision.
  - ICC must not be removed or disabled by the Entrant for any Session.
  - If installed, ICC replacement dummy minimum weight is one (1) pound.

## ARTICLE 11. REFUELING SYSTEM

### 11.1. Fuel Transfer

- 11.1.1. Fuel may be transferred from the autonomous supply tank to the Car using the equipment and methods defined in this Article.
- Approved equipment as defined herein must be:
    - Unmodified.
    - Installed and operational.
  - Approved method:
    - Gravity.
- 11.1.2. Fuel transferred to the autonomous supply tank must be delivered by means of a hose fitted with a self-sealing connector (e.g. dry break, cam-lock) connected to the autonomous supply tank.

### 11.2. Pit Tank

- 11.2.1. Construction of the Autonomous Supply Tank must:
- Comply with FIA Appendix J Drawing n° 252-7 with the exception of the top plate shape and dimensions.
  - Any configuration of the IMSA-mandated design intended to decrease the minimum refueling time below the minimum time listed in the class specific BoP table is prohibited.
  - Have a simple cylindrical internal shape.
  - Not have any additional internal parts that could improve flow.
  - Have a tolerance on bottom flatness of less than 3 mm inside the tank.
  - Have the flow restrictor top face at the level of the internal surface of the bottom of the supply tank.
  - Have provisions to seal any mechanisms that regulate tank height.

- 11.2.2. Pit tanks are assigned a serial number by IMSA Technical Officials.
  - a. IMSA Technical Officials will apply a non-removable official technical inspection serial number label to pit tanks
- 11.2.3. Refueling tank height is measured from the top surface of the vessel, not including vent, cover, cover plate, or fasteners, at a distance of 1.25 meters from the outermost face of the pit wall.
  - a. The required refueling tank height is 2.0 meters with a tolerance of +0/-1.0 cm.
- 11.2.4. Once inspected by an IMSA Official the Autonomous Supply Tank, Trolley, Peripheral Connections, and Restrictor must remain as inspected with all IMSA seals intact until the conclusion of the Race or upon an approved retirement via TIMS.
- 11.2.5. Above the tank there must be an air vent system complying with the specifications herein and the FIA appendix J drawing n° 252-7.

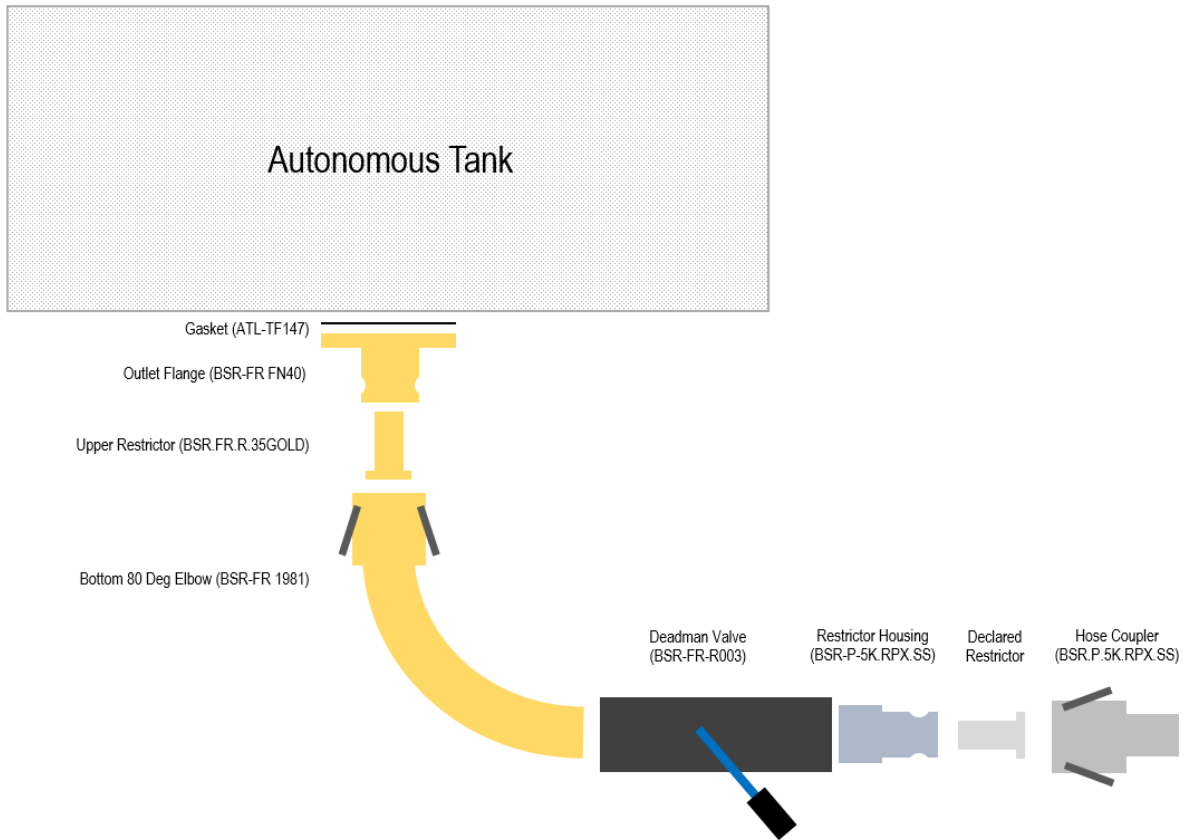
**11.3. Peripheral Connections**

- 11.3.1. Tanks must be equipped with the IMSA-specified peripheral connections between the tank outlet and the refueling hose.
  - a. Parts must be purchased from RPXpress (Phone: +1-828-428-0820 Email: [Imcelwain@rpxpress.com](mailto:Imcelwain@rpxpress.com)) and used unmodified:

Part Number	Part	Description
BSR-FR FN40	Outlet Flange	Bottom Tank 12-bolt housing
ATL-TF 147	12-Bolt Gasket	
BSR.FR.R.35GOLD	35.0mm Restrictor	Upper Restrictor (for positive seal to Elbow)
BSR-FR 1981	Bottom 80 deg. Elbow	Female Camlock x 2" Male
BSR-FR R003	Deadman Valve	Stainless Deadman Valve
BSR.P.5K56.SS	Restrictor Housing	Deadman Outlet, 2" Male to 1 1/2" Camlock

- b. FIA nut ring, as-supplied with original tank, must be used to secure the restrictor housing to the bottom of the supply tank.
- c. A 0.125 inch hole must be drilled in two adjacent bolts connecting restrictor housing and FIA nut ring.

d. Refueling System Assembly Illustration:

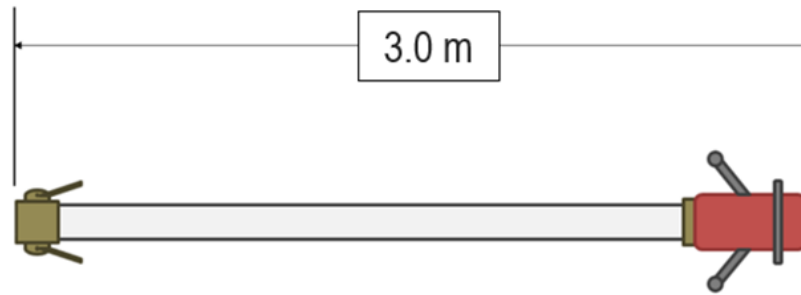


- 11.3.2. Deadman valve and bottom 80 deg. elbow assembly must be securely braced to remain attached to the tank in the event of an incident.
  - a. Mechanisms preventing normal operation of the deadman valve are prohibited.
  - b. Any configuration of the IMSA-mandated design intended to decrease the minimum refueling time below the minimum time listed in the class specific BoP table is prohibited.
  - c. During fuel delivery operations, the deadman valve must be fully open such that the throat of the ball is aligned axially with the outlet of the deadman valve body with the actuation handle fully extended.
- 11.3.3. During refueling the air vent outlet must be connected using an appropriate coupling to the tank.
  - a. In dual point refueling, the dedicated vent hose maximum inside diameter must be less than 1.5 inches.
- 11.3.4. A sight glass may be installed to the outside of the supply tank and must be equipped with isolating valves mounted as close as possible to the tank.

**11.4. Refueling Hose**

- 11.4.1. Refueling/vent hoses must have one end equipped with a self-sealing connector to fit the autonomous supply tank outlet.
- 11.4.2. Refueling/vent hoses may be protected for the sole purpose of resisting abrasion damage.
  - a. Cover must be easily removable by means of full-length Velcro or zipper.
  - b. Cover must be non-reflective
- 11.4.3. Hose maximum inside diameter:
  - a. Dual-port systems must be less than 1.5 inches for all hoses.
  - b. Single-port (coaxial) systems must be less than 1.5 inches for Refueling Hose and less than 75.0mm for Vent Hose.

11.4.4. Refueling hose minimum length must be greater than 3.0 meters.



- a. Minimum length is measured from the most distant plane of the dry break/fuel probe to the most distant plane of the fuel hose coupler.
- b. Cars employing an approved offside refueling system, must have a vent hose with a minimum length of six (6) meters, connectors included.

### 11.5. Pit Tank Support Stand

11.5.1. The tank must be attached to one of the following:

- a. To a trolley meeting the following requirements:
  - i. All tower components must be assembled without any degree of freedom in relation to the trolley.
  - iii. Have a surface area greater than two (2) square meters.
  - iv. Utilize four (4) self-braking casters.
  - v. Be ballasted with a weight exceeding that of the tank when filled with fuel.
- b. Scissor style (X-brace) stand.

### 11.6. Boom

11.6.1. Entrants may attach a member (boom) to the trolley.

- a. Boom must be independent of the tank and the tower.
  - i. Boom member must be permitted a degree of freedom in relation to the trolley (rotation following a vertical axis).
- b. Boom may support:
  - i. Hose for a Car utilizing an approved offset vent or fuel filler.
  - ii. Lighting for the illumination of the pit stop.
  - iii. Download cable.

11.6.2. Boom must be identified with the Car number fixed to its outboard end, that must be:

- a. Visible from either direction
- b. A minimum of seven (7) inches high with a 1.25-inch stroke

11.6.3. Boom must respect the following dimensions:

- a. Must not exceed four (4) meters in length
- b. Must permit free passage of a height of two (2) meters over its entire length including hoses and/or accessories.

### 11.7. Refueling Restrictor

11.7.1. During refueling, all fuel entering the Car must pass through the refueling restrictor.

11.7.2. Refueling Restrictor must meet the following criteria:

- a. Material must be an aluminum alloy.
- b. Must comply with the IMSA Fuel Restrictor Part Drawing at the end of these Technical Regulations.
- c. Restrictor size varies from 22.0 mm to 34.0 mm by discrete increments 0.25 mm
- d. Bore tolerance (+0.00 mm / -0.05 mm)

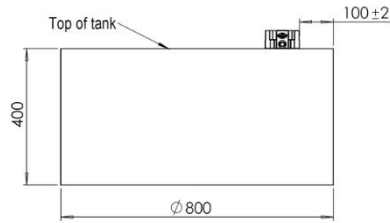
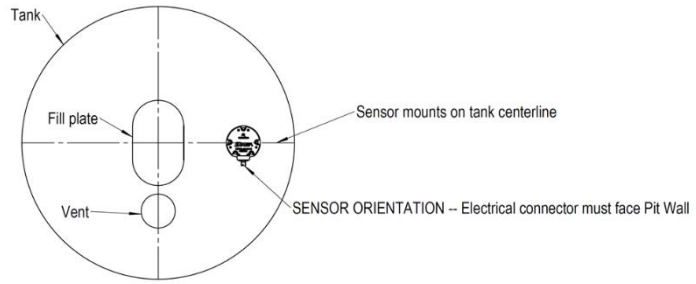
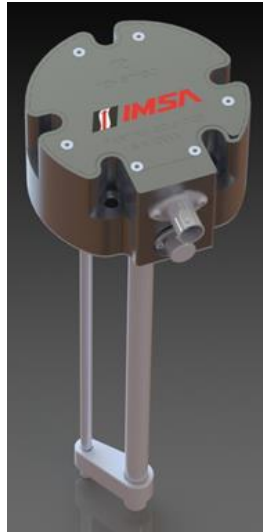
- 11.7.3. IMSA may adjust the refueling rig height and the minimum refueling time listed in the class specific BoP Tables and associated Technical Bulletins.
- a. Refueling restrictors may be purchased from RPXpress (Phone: +1-828-428-0820 Email: lmcclwain@rpxpress.com).
  - b. At each Event, every Entrant must declare their chosen diameter, limited to 22 to 34 mm in 0.25 mm increments, by completing the [IMSA Refueling Restrictor Declaration Form](#) prior to 5:00 PM Local Time the day before race day.
  - c. IMSA utilizes the following scrutineering inspection methods to check minimum refueling times:
    - i. Calibrated autonomous fuel supply tank level sensor system.
    - ii. Calibrated vehicle fuel flow sensors.
    - iii. Minimum Refueling Time Audit (Reference: SRR 37.6).
- 11.7.4. Refueling Restrictors are sealed by IMSA Technical Officials.
- a. Entrants must receive written approval from IMSA to remove seals following inspection, and seals must be replaced by IMSA Technical Officials prior to on-track activity.
  - b. The following items must be drilled for safety-wire sealing of the restrictor
    - i. Two (2) adjacent Bolt heads of the Restrictor Housing
    - ii. Two (2) Hinge Bolts (threaded section) of the Outlet Pipe Cam Lock
    - iii. Two (2) Lock Lever Arms of the Refueling Hose Cam Lock
    - iv. A 0.125 inch hole must be drilled in the two female camlock levers on the bottom 80 deg. elbow assembly 0.5 inches below pin in the locations indicated in yellow on the diagram below:



## 11.8. Level Sensor System

- 11.8.1. Autonomous fuel supply tanks must be equipped with an IMSA Level Sensor Kit and wiring loom.
- 11.8.2. The level sensor kit and wiring loom are available for purchase from IMSA, and are listed on the IMSA Accessories Order Form.
- a. Level sensor kits include:
    - i. Sensor Package
    - ii. Gasket
    - iii. Nut Plate
    - iv. All other hardware required to install the sensor in the tank
  - b. Replacement parts are listed on the IMSA Accessories Order Form.
- 11.8.3. Sensor package consists of the following sensors integrated into a single housing:
- a. Capacitive fluid level sensor
  - b. Fuel temperature sensor
  - c. Vent pressure sensor

- 11.8.4. Sensors packages are serialized, and assigned to a Car and Pit Tank.
  - a. Sensors packages are calibrated to the assigned Pit Tank.
    - i. Calibrations require a drum of fuel, 2 crew members, and standard refueling safety equipment, as per Sporting Regulations 21.2.1
    - ii. Sensor package must remain exclusive to the assigned Car and Pit Tank.
  - b. Sensor packages are sealed by IMSA Technical Officials.
    - i. Entrants must receive written approval from IMSA to remove seals following calibration, and seals must be replaced by IMSA Technical Officials prior to on-track activity.
    - ii. Recalibration of sensor and tank may be required before Race.
- 11.8.5. Wiring loom connects the sensor package to a dedicated port on the IMSA pit-lane network box.
  - a. Wiring loom must be IMSA certified and unmodified.
- 11.8.6. Entrant must ensure the level sensor system is functional.
  - a. Two hours before 1<sup>st</sup> Practice Entrant must connect the loom to a specific pit-lane network box designated by IMSA.
  - b. Loom must remain connected until the conclusion of the Event
  - c. Entrant must remove the loom at the conclusion of the Event.
- 11.8.7. Sensor packages must be installed in the location and orientation as indicated in the following diagrams.
  - a. Drilling templates and other dimensioned drawings that will assist in the modification of the tanks to accommodate the sensor installation are also included.



REVISION	DATE	APPROVED
01	27.10.15	NIM
02	07.11.15	NIM
03	14.11.15	NIM

DESIGNER	NAME	DATE
CHECKED		
APPROVED		
MTC		
D.A.		

DATE	27.10.15
SCALE	1:1
SHEET	01

