

## SECTION F: OPERATIONAL REGULATIONS

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**CONVENTION:**

- Black Text: Text unchanged from 2026 F1 Regulations - Section F [Operational] – Iss 01 Approved by the WMSC on 11/12/2024
- Pink Text:** Changes approved by the WMSC 10/06/2025.
- [Green Text]:** Comments / explanations / indication of further work: non-binding and non-regulatory

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### ARTICLE F1: GENERAL PRINCIPLES

ARTICLE F2: SCOPE, SANCTIONS AND BREACHES

**ARTICLE F3: COMPETITORS' SHUTDOWN PERIOD****F3.1 F1 Team Factory Shutdown Periods**

*[Advisory Committee: TAC      Governance: F1 Commission / WMSC]*

- F3.1.1** All F1 Teams must observe two shutdown periods:
- The first period of fourteen (14) consecutive calendar days during the months of July and/or August. If two consecutive Competitions during this period are separated by only seventeen (17) days a shutdown period of thirteen (13) consecutive calendar days must be observed. In either case F1 Teams should notify the FIA of their intended shutdown period within thirty (30) days of the start of the Championship.
  - The second period of nine (9) consecutive calendar days starting on the 24 December.
- F3.1.2** During the shutdown periods no F1 Team or affiliate to a F1 Team may carry out or instruct a third-party supplier to carry out any of the following activities for or on behalf of the F1 Team:
- Operation or use of any wind tunnel, except as specifically permitted by Article F3.1.4.
  - Operation or use of any computer resource for CFD Simulations, except as specifically permitted by Article F3.1.4.
  - Production or development of wind tunnel parts, car parts, test parts or tooling.
  - Sub-assembly of car parts or assembly of cars.
  - Any work activity by any employee, consultant or sub-contractor engaged in design, development or production (excluding any work activity to be undertaken at the circuit in preparation for the Competition immediately following the shutdown periods).
- F3.1.3** Each F1 Team must notify its suppliers of the dates of its shutdown periods and must not enter into any agreement or arrangement with the intention of circumventing the prohibition on the above activities.
- F3.1.4** During the shutdown periods the following activities will not be considered a breach of the above:
- Repairs carried out with the agreement of the FIA to a car seriously damaged during the Competition preceding the shutdown period.
  - The assembly and servicing of running or static show cars, none of which may entail the production, assembly or servicing of any current car parts.
  - The operation and use of any wind tunnel provided this is being carried out for projects with no direct relation to Formula One or for or on behalf of a F1 Team that is not at that time within its own shutdown period or for the purposes of maintenance or modifications to the facility (at the exclusion of any activity defined as Restricted Wind Tunnel Testing in Appendix 7 of the Sporting Regulations).
  - The operation and use of any computer for CFD simulations provided this is being carried out for projects with no direct relation to Formula One, or for or on behalf of a F1 Team that is not at that time within its own shutdown period or for the purposes of system or software upgrade or maintenance (but not for activities which may be deemed as methodological development or are defined as Restricted CFD Simulations in Article F4 of these Operational Regulations).

- e. Any activity the sole purpose of which is supporting projects unconnected to Formula One, subject to the prior written approval of the FIA.
- f. Any activity the sole purpose of which is the maintenance of factory facilities.
- g. Any activity the sole purpose of which is the maintenance of factory IT networks and associated systems.
- h. Any activity relating to the loading, unloading, and preparation of sea freight, with the exception of car components or assemblies.
- i. Any activity the sole purpose of which is staff wellbeing or entertainment.
- j. During the shutdown period described by F3.1.1 b. only, any activity the sole purpose of which is to obtain accurate inventory quantities for financial purposes through a process of counting items of inventory and where such items return to the same physical location after the process as they were in prior to the start of the shutdown.

## F3.2 Power Unit Manufacturer Factory Shutdown Periods

*[Advisory Committee: PUAC      Governance: PU Manufacturers' Governance Agreement / WMSC]*

### F3.2.1 All PU Manufacturers must observe two shutdown periods:

- a. The first period of fourteen (14) consecutive calendar days during the months of July and/or August. If two consecutive Events during this period are separated by only seventeen (17) days a shutdown period of thirteen (13) consecutive calendar days must be observed.
  - b. The second period, only from 2023, of nine (9) consecutive calendar days starting on the 24 December.
- F3.2.2 For the period 2022-2025, the shutdown periods for PU Manufacturers who have homologated Power Units for the 2022-2025 Championships must be concurrent between the two Power Unit programmes (2022-2025, and 2026-2030).
- F3.2.3 If a PU Manufacturer or affiliate to a PU Manufacturer has factories based in countries where law and/or unions impose a different closing week, these factories may replace one week out of two weeks of the shutdown period specified in Article F3.1.1a. by the locally imposed week and have their second shutdown period specified in Article F3.1.1b. starting no later than 31 December. PU Manufacturers affected by this must make a declaration to the FIA that the staff concerned will not be permitted to transfer to work in the country that isn't shutdown during these periods.
- F3.2.4 For each year, PU Manufacturers must notify the FIA of their intended shutdown periods within thirty (30) days of the start of the Championship of that year.
- F3.2.5 During the shutdown periods no PU Manufacturer or affiliate to a PU Manufacturer may carry out or instruct a third-party supplier to carry out any of the following activities for or on behalf of the PU Manufacturer:
- a. Any work activity by any employee, consultant or sub-contractor engaged in design, development or production (excluding any work activity to be undertaken at the circuit in preparation for the Event immediately following the shutdown periods).

- b. Operation or use of any test bench except as specifically permitted by Article F3.2.6. During the shutdown periods no occupancy hours nor operation hours may be incremented neither unrestricted test bench hours for projects connected to Formula One.
- c. Operation or use of any computer resource for simulations except as specifically permitted by Article F3.2.6.
- d. Production or development of Power Unit parts, test parts, car parts, or tooling.
- e. Sub-assembly of Power Unit parts or assembly of Power Units.

**F3.2.6** During the shutdown periods the following activities will not be considered a breach of the above:

- a. The assembly or servicing (but not manufacture) of Power Units for running show cars.
- b. Work on any test bench or computer resource for the purposes of maintenance or modifications to the facility (at the exclusion of any activity defined as Restricted Power Unit Testing in Article F5 of these Operational Regulations).
- c. Any activity the sole purpose of which is supporting projects unconnected to Formula One, subject to the written approval of the FIA.
- d. Any activity the sole purpose of which is the maintenance of factory facilities.
- e. Any activity the sole purpose of which is the maintenance of factory IT networks and associated systems.
- f. Any activity relating to the loading, unloading, and preparation of sea freight, with the exception of power unit components or assemblies.
- g. Any activity the sole purpose of which is staff wellbeing or entertainment.
- h. ES Charging and/or balancing of an Energy Store containing ES cell(s) may be carried out with the agreement of the FIA. The DC current involved in these operations is limited to 5A while charging the ES cells and to a maximum rate of 0.1C during the balancing. This activity must not take place in any nominated test bench and must involve a maximum of two personnel.
- i. During the shutdown period described by F3.2.1 b. only, any activity the sole purpose of which is to obtain accurate inventory quantities for financial purposes through a process of counting items of inventory and where such items return to the same physical location after the process as they were in prior to the start of the shutdown.

**F3.2.7** Each Power Unit Manufacturer must notify its suppliers of the dates of its shutdown periods and must not enter into any agreement or arrangement with the intention of circumventing the prohibition on the above activities.

**F3.2.8** For the period until twelve months after confirmation of entry by the FIA, the provisions of this Article 2 will not apply to New PU Manufacturers, as defined in Appendix C8 of the Technical Regulations.

**ARTICLE F4: AERODYNAMIC TESTING RESTRICTIONS (ATR)**

[Advisory Committee: TAC Governance: F1 Commission / WMSC]

**F4.1 General conditions**

- F4.1.1** The ATR, and the definitions and rules which will apply to aerodynamic testing, are as follows:
- F4.1.2** Restricted Aerodynamic testing is the testing by a F1 Team or any Associate of a F1 Team and/or by any contracted party of a F1 Team or of any Associate of a F1 Team or any external entity working on behalf of a F1 Team or for its own purposes and subsequently providing the results of its work to a F1 Team in a test environment or numerical simulation of a representation of an F1 car or sub-component in order to measure, observe or infer any forces, displacements, pressures or air flow direction resulting directly or indirectly from the incident air flow.
- F4.1.3** A three-dimensional representation of an F1 car or sub-component subject to Restricted Aerodynamic testing, defined either physically or digitally, will be considered for the purposes of this Article as a Restricted Aerodynamic Test Geometry (RATG) and save for where specifically permitted by this Article may not be added to, removed from, morphed or modified. In order to prevent Restricted Aerodynamic testing methodologies intended to subvert any limits on the number or nature of RATGs permitted under the ATR the following will apply:
- The purpose of a RATG is to allow aerodynamic assessment of a single new geometry, with aerodynamic dependency maintained throughout the simulated flow field. Any attempt to derive aerodynamically independent results for subcomponents of a RATG, either in the initial simulation or test, or by subsequent modification to the simulation or test conditions, is not permitted. Any attempt to use boundary conditions or similar to infer the effect of combining RATGs, without accruing a further RATG, is also not permitted. The use of boundary conditions cannot be exploited to simulate the effect on the fluid of a geometry which is different from the RATG in use.
  - If the representation contains external bodywork surfaces on both sides of the centre plane of the car these must be symmetrical about this plane with the exception of the wheel bodywork defined by Article C3.15 of the Technical Regulations. Minimal exceptions for parts directly associated with the cooling of the power unit, or changes of car attitude allowed under sections F4.3.4 (roll and steer) and F4.4 will be permitted.
  - Excluding permitted degrees of freedom for RWTT and changes in RCFDs, the substitution or replacement of any part of a RATG with a non-F1 car geometry, or the placement of any physical or computational boundary condition or solver setting, that simulates or attempts to simulate a modification to this RATG will be considered as a new RATG.
  - Sections (or sub-models) of a RATG which is used for RCFDs may be created by removing geometry from the parent RATG and placing boundary conditions of velocity or pressure profiles generated entirely from the same RATG to replicate the flow field resulting from the geometry that has been removed. This will not be considered as a new RATG provided any geometry within the section is identical to the parent RATG. Exceptionally where downstream portions of the RATG are removed these may be replaced with a single geometry approved for this purpose by the FIA.

- e. Sections (or sub-models) of a RATG used for RCFDs and created by removing geometry from a parent RATG may not be subsequently geometrically modified without being considered as a new RATG. Any boundary conditions of velocity or pressure profiles added in the process of creating the section (or sub-model) and used to replicate the flow field resulting from the geometry that has been removed may not be changed to boundary condition or profiles other than those generated from the parent RATG without being considered a new RATG.
- f. If the representation contains surfaces that represent components of more than one F1 car then it shall be construed as the equivalent number of RATGs. Excluding permitted degrees of freedom for RWTT and changes in RCFDs, any subsequent modification of the relative position of the representations of F1 cars will be considered as new RATGs equivalent to the number of F1 car representations.
- g. A baseline RATG is defined as a reference chosen from time to time that serves for comparison purposes.

**F4.1.4** An Aerodynamic Testing Period (ATP) is a period of consecutive calendar weeks for the purposes of evaluation of the limits within this Article. As soon as one ATP ends a new one begins, with no gaps between them.

There will be 6 ATPs in any year. The dates of these periods will be as follows:

- a. Period 1 will start on 1 January and finish at the end of week 9.
- b. Periods 2, 3 and 5 will run for exactly 8 weeks each.
- c. Period 4 will run for 10 weeks, comprising the Summer Factory Shutdown described in Article F3.1.1.
- d. Period 6 will end on the 31 December.

For the above definition, weeks are assumed to start on a Monday and week 1 is the first week of four days or more in the calendar year.

In exceptional circumstances the FIA may revise these ATP at its absolute discretion in accordance with changes or events likely to affect these restrictions.

**F4.1.5** In the context of this Article the words bodywork and sprung suspension will have the same definition as those provided by Article C3 and Article C10 of the Technical Regulations.

Any data acquired during Restricted Aerodynamic testing may only be available to the F1 Team that acquired it through use of the restricted aerodynamic testing available to it in accordance with the limits in this Article.

## F4.2 **Restricted Wind Tunnel Testing (RWTT)**

**F4.2.1** RWTT may only be carried out in wind tunnels which have been nominated by the F1 Team to the FIA. Each F1 Team may nominate only one wind tunnel for use in any one twelve-month period and declare it in writing to the FIA. For a new entrant, the nomination must be made no later than 7 days after the date on which it officially becomes a F1 Team. No re-nominations may be made for at least 12 months. Nominations should include the facility location, unique identification of the wind tunnel and the scale of model and RATG to be used. The FIA will consider, at its absolute discretion, earlier or temporary nominations if a wind tunnel already nominated by a F1 Team suffers a long

term failure or for the purpose of evaluating alternative wind tunnels. If a different facility is to be used or if the existing facility is changed or upgraded, other than for routine maintenance or replacement, then a new declaration must be submitted to the FIA within one month of the change or at the time of submission of a testing period report whichever is earlier.

For the avoidance of doubt, any RWTT carried out on behalf of or for the benefit of the F1 Team by an Associate, a contracted party of the F1 Team or of any Associate of the F1 Team or any external entity working on behalf of the F1 Team or for its own purposes and subsequently providing the results of its work to a F1 Team must take place in the wind tunnel nominated by the F1 Team.

**F4.2.2** The limits for RWTT will be the number of runs of RWTT, the amount of wind tunnel occupancy time and wind tunnel wind-on time.

- a. During RWTT a single run will be deemed to commence each time the wind tunnel air speed rises above 5m/s and will end the first time thereafter it falls below 5m/s.
- b. During RWTT, once the wind tunnel air speed rises above 5m/s the RATG must remain fixed and unmodified until the wind tunnel air speed returns below 1m/s.
- c. Between runs of RWTT detail changes to the RATG and model are permitted.

**F4.2.3** Wind on time is defined as the amount of time in hours summed over the ATP, where the wind tunnel air speed exceeds 15m/s for RWTT.

**F4.2.4** During RWTT, the first shift of occupancy will be deemed to commence the first time the wind tunnel air speed is above 5m/s on a given calendar day, and will end at a time, declared by the **F1 Team**, when the wind tunnel air speed falls below 5m/s on the same calendar day. A second shift of occupancy will be deemed to commence the first time the wind tunnel air speed is above 5m/s following the end of the first shift of occupancy (on the same calendar day) and will end, either when the wind tunnel air speed falls below 5m/s for the last time on the same calendar day or, at the end of the calendar day in the event a run is still in progress. Only two shifts of occupancy may be carried out in any one calendar day.

**F4.2.5** In the event of a demonstrated wind tunnel failure or other Force Majeure the FIA will consider, at its absolute discretion, permitting additional occupancy to be used to compensate for that which is lost as a result.

**F4.2.6** For the avoidance of doubt any RWTT performed for the F1 Team by any Associate of the F1 Team and/or by any contracted party of the F1 Team or of any Associate of the F1 Team or any external entity working on behalf of the F1 Team or for its own purposes and subsequently providing the results of its work to the F1 Team during an ATP will be subject to these same limits as if the tests were performed by the F1 Team.

### **F4.3 RWTT Permitted technology**

The following restrictions apply during RWTT:

**F4.3.1** Only wind tunnels that use air at atmospheric pressure as the test fluid are permitted. Other than rotations of the RATG and model or ground plane about the yaw axis, designs which attempt to create curved flow conditions relative to the RATG are not permitted. For closed section wind tunnels adaption of vertical walls and the ceiling to improve air flow uniformity is permitted. Particle

image velocimetry systems where the wind tunnel air transports a flow visualisation medium are permitted.

- F4.3.2** No RWTT may be carried out using a scale model and RATG which is greater than 60% of full size neither may it be carried out at a wind tunnel air speed exceeding 50m/s measured relative to the scale model and RATG. Furthermore, during restricted wind tunnel testing the magnitude of the rate of change of the wind tunnel air speed measured relative to the scale model and RATG must be less than 4.5m/s<sup>2</sup>. The rate of change of the wind tunnel air speed will be defined as the derivative of wind tunnel air speed and smoothed using a moving average filter, centred on each sample, of period 0.5 seconds during each wind tunnel air speed ramp up and ramp down phase. These phases are defined as the periods when the wind tunnel air speed is varying between 15m/s and 95% of the maximum wind tunnel air speed during a run.
- F4.3.3** Only one model and RATG may be used per run. A maximum of two models may be used and a single model change made per **F1 Team** per 24 hour period. For the avoidance of doubt, a model in this context is defined by its underlying spine, motors and sensors.
- F4.3.4** The only permitted degrees of freedom of the model and RATG during a run of RWTT are:
- Wheel rotation about the wheel axis
  - Changes of ride height and roll angle relative to the ground plane and associated articulation of the elements representing the RATG suspension
  - Changes of load applied to wheels through the elements representing the RATG suspension
  - Steering of the front wheels
  - Changes of yaw angle relative to the incident air flow and/or ground plane
  - Simulation of differing exhaust flow
  - Adjustment of the ~~flap angle of the front wing~~ flap angles of the adjustable regions of the Front Wing Profiles (as defined by C3.10.10 of the 2026 Technical Regulations)
  - Adjustment of the incidence of the ~~rearmost and uppermost element of the top rear wing~~ incidence of the RW Flap (as defined by C3.11.6 of the 2026 Technical Regulations)
  - Adjustment or operation of sensors
  - Application of flow visualisation liquids
- F4.3.5** Changes of attitude of the model and RATG may not occur at a rate that requires changes of ride height at the front or rear axle centreline greater than the scale equivalent of 0.033 m/s on the full size F1 car and/or rotation about the yaw or roll axes at a rate greater than 1.0 deg./s.
- F4.3.6** Where non-rigid wind tunnel tyres are used for RWTT these may only be produced by the appointed tyre supplier. Furthermore, devices that actively modify the shape of the tyre during RWTT other than as a result of vertical and lateral loads reacted at the contact patch are not permitted. Tyre pressure control is permitted but the complete wheel must contain only a single fixed internal gas volume. Systems which apply lubricant directly or indirectly to the wind tunnel tyres in order to reduce friction at the contact patches are permitted.

#### F4.4 **Restricted CFD (RCFD) simulations**

RCFDs are Computational Fluid Dynamics (CFD) simulations by a F1 Team or any Associate of a F1 Team and/or by any contracted party of a F1 Team or of any Associate of a F1 Team or any external entity working on behalf of a F1 Team or for its own purposes and subsequently providing the results of its work to a F1 Team of flows that are gaseous in the case of a F1 car and are not classified as power unit simulations. Any simulation of flows contained within the power unit cooling or lubrication systems, air, air/fuel mixtures, combustion process or products of combustion from a boundary commencing at the power unit's atmospheric air intake ducts, passing through the power unit and finishing at the exit of the exhaust tailpipe will be classified as a power unit simulation.

For the avoidance of doubt, if any CFD simulation (other than the power unit simulation defined above) reveals information to a F1 Team or to an Associate of the F1 Team whether directly, via a contracted party or via an external entity working on behalf of a F1 Team or for its own purposes and subsequently providing the results of its work to a F1 Team, about flows that are gaseous on a F1 car then it is a RCFD simulation. For example, any CFD simulations conducted at scales other than 1:1 or using non-gaseous fluids are still RCFDs as they reveal information about flows that are gaseous on the full size F1 car.

**F4.4.1** A RCFDs refers to the pre-processing, the solver part or parts of the simulation process, and the post processing of the results of the simulation.

- a. Pre-processing refers to the meshing, decomposition and setup of the simulation.
- b. Solver refers to the program or programs that compute the solution of the equations describing the flow including any extension of the simulation or simulations involving additional numerical computation (for example but not limited, to adjoint computation).
- c. Post processing refers to the generation of representations of the flow solution that require numerical processing, for example but not limited to the computation of pressure coefficients, velocity, shear stress, flow streamlines or vorticity. Generation of videos or images displaying this information and any form or application of machine learning, deep learning or artificial intelligence (AI) based on simulation results is included in this definition.

During or prior to RCFDs the only permitted changes to the RATG are its attitude (ride height, roll, yaw, steer and associated tyre shape or contact patch) ~~and front wing flap, flap angles of the adjustable regions of the Front Wing Profiles (as defined by C3.10.10 of the 2026 Technical Regulations) or rear wing rearmost and uppermost element incidence and incidence of the RW Flap (as defined by C3.11.6 of the 2026 Technical Regulations)~~. Furthermore, if a change in attitude causes an intersection between the Floor Bodywork and/or plank assembly and simulated ground plane, a local trim will be permitted to the Floor Bodywork and/or plank assembly only. Any trim must be the minimum required to remove the intersection, must be visible from below and must lie between  $X_F=400$  and  $X_R=0$ . For avoidance of doubt, should any other changes be made to the RATG during any stage or pause in process ~~#b.~~ above (such as a morphing, or the addition or substitution of any boundary condition with the intent to replicate an alternative geometry) a new RATG must be counted each time a change occurs.

Changes to parts classified as LTC, TRC or OSC and contained entirely within the drum volume defined by article C3.14.2 and the scoop defined by article C3.14.4 of the Technical Regulations and outboard of  $Y_W=0$  and only for the purpose of developing cooling are permitted.

Modifications to surface and volume mesh resolution and type provided they have the purpose of resolving and solving exactly the same geometry to a tolerance of 0.5mm scaled to a 1:1 car, as well as the extent of the far field domain, changing the simulation between a wind tunnel or track environment, initialisation, boundary conditions, solver settings and methodology are allowed. None of these modifications may be exploited to circumvent the requirements of the ATR by otherwise creating the effect of a change to the RATG. For the purposes of the ATR “far field” will be considered to be greater than 1m from any part of the F1 car or sub-component scaled to a 1:1 car.

A RATG may be used in RCFDs with geometry on only one side of the car centre plane, using a symmetric boundary condition on that plane, or with geometry on both sides of the car centre plane, subject to the geometric symmetry requirements of Article F4.1.3. Changing between these two representations will not be considered a new RATG.

The addition of non-gaseous computational regions (including but not limited to coupled structural solver elements and conjugate heat transfer solid models) are not considered changes to the RATG provided that no geometric changes to the RATG itself take place during or prior to RCFDs.

The solver part or parts of all RCFDs must only be carried out using a compute resource that contains a set of homogeneous processing units and that has been nominated by the F1 Team to the FIA. Each F1 Team must declare to the FIA in writing the compute resources that are employed for the purpose of the solver part or parts of RCFD simulations. Floating, fixed point and integer operations from the solver part or parts of RCFD simulations must only run on and may not be offloaded from these CPU cores. **From 1 January 2028 onwards, regulation will be introduced that will allow the use of GPU cores.**

**F4.4.2** The declaration of a compute resource by the F1 Team to the FIA must include:

- a. The computer or cluster identification, manufacturer, model and location and the manufacturer, name and full unique model number of the Processing Units.
- b. Number of processing unit cores in the compute resource.
- c. Processor speed at which each Processing Unit is configured to run at 100% CPU load (CCF). In order to prevent deliberate underclocking this value may not be lower than the standard or base clock frequency given by the Manufacturer’s specification.

Any specification of compute resource declared must be available on a non-exclusive basis to all F1 Teams.

**F4.4.3** If the compute resource is changed or upgraded then a new declaration must be submitted to the FIA within one month of the change or at the time of submission of a testing period report whichever is earlier. Such changes might include, but are not limited to, a change of the hardware specification, addition or removal of processing units or change of location of any part of the compute resource.

**F4.4.4** The amount of compute resource used for the solve part or parts of all RCFDs shall be measured in Mega Allocation Unit hours (MAUh) and will be calculated as follows.

$$\text{AUh} = (\text{NCU} * \text{NSS} * \text{CCF}) / 3600$$

Where:

Auh = The total number of Unit hours allocated to a CFD solver run. An Allocation Unit hour represents the use of a unit of resource allocation for one hour (and  $1 \times \text{MAUh} = 1,000,000 \times \text{AUh}$ ). An Allocation Unit hour is equivalent to a core hour on a physical CPU core.

CCF = Peak Processing Unit clock frequency in GigaHertz achieved during the CFD solver run. This will be the peak frequency theoretically achievable during the run based on one of the following:

- a. The standard or base clock frequency value from the Processing Unit Manufacturer's specification (if overclocking or enhanced modes are not used in the run).
- b. The maximum "turbo", "HPC" or other enhanced mode frequency value.
- c. The maximum overclocked frequency value.

NCU = Number of Processing Unit cores used for the solver run. The effects of multi-threading, where simultaneous threads run on the same physical core will be ignored.

NSS = Number of solver wall clock seconds elapsed during the run. Message passing time during calculation must also be included.

All information required for auditing of this calculation must be present in the output from the run including the CCF value.

#### F4.4.5

Non-RCFDs can be made by a F1 Team provided that:

- a. They have been requested by the FIA and use a previously simulated RATG, and that these simulations are run as specified by the FIA and the results made available to the FIA; or
- b. They use a unique RATG which has been simulated in CFD more than 30 months ago and are for the purpose of optimising CFD methodology; or
- c. They use an FIA approved CAD geometry provided to all F1 Teams on an equitable and transparent basis and are for the purpose of optimising CFD methodology; or
- d. Subject to e. and for the sole purpose of contributing toward the development of future regulations only, they use an FIA approved geometry provided for this purpose or as a basis for modification a unique RATG which has been simulated in CFD less than 30 months ago.
- e. Non-RCFDs for future regulations are conditional on the full list and details of all such Non-RCFDs (including but not limited to geometries, attitudes, flow conditions) being approved by the FIA in advance of any work being carried out and full reports of the results being made available to all F1 Teams, via the FIA, with no team-specific Intellectual Property shared.
- f. They are carried out using only the nominated compute resources described above.
- g. The unique RATG or FIA approved geometry is not changed, added to, removed from, morphed or modified. Exceptions to this are permitted for the replacement of elements of the RATG or FIA approved geometry, with boundary conditions for the purposes of developing CFD sub-modelling methodology provided it does not attempt to simulate a modification to this RATG or FIA approved geometry, or where geometry changes are explicitly permitted and pre-approved by the FIA for the development of future regulations.

For the avoidance of doubt, any Non-RCFDs carried out on behalf of or for the benefit of the F1 Team by an Associate, a contracted party of the F1 Team or of any Associate of the F1 Team or any external entity working on behalf of the F1 Team or for its own purposes and subsequently providing the results of its work to a F1 Team must also ~~be carried out using a unique RATG which has been~~

~~simulated in CFD by the F1 Team more than 30 months ago or an FIA approved geometry meet all the requirements set out in F4.4.5 above.~~

- F4.4.6** In the case of Non-RCFDs using a unique RATG which has been simulated in CFD more than 30 months ago or Non-RCFDs using an FIA approved geometry, geometry manipulations (e.g. in CAD clean-up or meshing software) having the sole purpose of reproducing exactly the same geometry previously solved in CFD or represented in the FIA approved CAD model or list (to a tolerance of 1.5mm scaled to a 1:1 car) are allowed. This tolerance is introduced only to allow for unintentional and incidental changes in geometry detail caused by the revisions in software and process. For the avoidance of doubt, static changes to car attitude (ride height, roll, yaw, steer and associated tyre shape or contact patch) and ~~front wing~~ flap angles of the adjustable regions of the Front Wing Profiles (as defined by C3.10.10 of the Technical Regulations) or ~~rear wing rearmost and uppermost element~~ incidence of the RW Flap (as defined by C3.11.6 of the Technical Regulations) are permitted. Furthermore, when using an FIA approved geometry the FIA may approve additional incidence changes to bodywork (“active aerodynamics”) which will be clearly identified within the FIA approved CAD files and associated documentation.
- F4.4.7** Modifications to surface and volume mesh resolution and type as well as the extent of the far field domain including changing the simulation between a wind tunnel or track environment, are allowed.
- F4.4.8** The limits for RCFDs will be revised periodically, to take account of advances in CFD simulations.

#### **F4.5 Exceptions to the Aerodynamic Testing Restrictions (ATR)**

- F4.5.1** Any aerodynamic test conducted by an F1 car at any Competition or any aerodynamic test conducted by an F1 car during and at track testing as defined by Article **B11** of the Sporting Regulations will not be considered as Restricted Aerodynamic testing.
- F4.5.2** Wind tunnel testing solely for the development of power unit heat exchangers that reject heat to air, or the running of the power unit from a boundary commencing at the power unit air intake ducts, passing through the power unit and finishing at the exit of the exhaust tailpipe will not be considered as Restricted Aerodynamic testing, provided that there is no direct or indirect measurement of aerodynamic force during the test. In this context, pressure and flow measurements within a duct shall not be considered to be measurements of aerodynamic force.
- F4.5.3** Steady state and dynamic engine dynamometer work with an F1 car or subcomponent will not be considered as Restricted Aerodynamic testing provided that:
- a. The bodywork used in the test has no front wing assembly as described in Article **C3.10** of the Technical Regulations) or rear wing assembly (described in Article **C3.11** of the Technical Regulations) present.
  - b. No devices designed to measure directly, or indirectly aerodynamic forces or flow field characteristics are installed in the facility used.
  - c. No sensor installed on the car or subcomponent which are capable of measuring displacements, pressures or air flow direction of the external airstream resulting directly or indirectly from the incident air flow may be logged. Logging files have to be available, if required, during the independent audit inspection.

- d. The gas flow exiting from the exhaust system is ducted away from the testing area before impacting on any bodywork component (other than the exhaust itself).

- F4.5.4** Wind tunnel testing solely for the development of brake systems (Article C11 of the Technical Regulations), wheels and tyres (Article C10 of the Technical Regulations), and for development and calibration of pressure sensing instrumentation (such as pitot tubes, multi-directional probes and Kiel tubes), provided such tests do not concurrently test, or in any way provide incidental data or knowledge on, the performance or endurance of parts or systems classified as bodywork will not be considered as Restricted Aerodynamic testing. Parts classified as wheel bodywork may be fitted for Wind tunnel testing solely for the development of brake systems, wheels and tyres.
- F4.5.5** Wind tunnel testing that uses a RATG for the sole purpose of the conditioning of wind tunnel infrastructure or the development of wind tunnel infrastructure (including all of its sub-systems such as rolling road, model motion system, force balance, wind tunnel model spine, sensors etc.) and methodology may be performed and will not count towards the accumulation of runs, wind-on time, and occupancy subject to the testing complying with either of the following restrictions:
- The front wing group and the rear wing group of the RATG must be removed from the wind tunnel for the duration of the testing. Alternatively, either one of or both the wing groups may be retained on the model, but each that remains must be fitted with a bluff cover that has been approved for this purpose by the FIA. The front and rear wing groups will be considered to be bodywork described by Articles C3.10 and C3.11 of the Technical Regulations respectively.
  - A RATG is used which is more than 12 months old, or represents an FIA approved CAD geometry provided for this purpose and that no modification is made to this previously tested RATG or FIA approved geometry.

During audit F1 Teams may be requested to demonstrate compliance of any such testing through the production of supporting data.

For the avoidance of doubt, any wind tunnel testing to develop bodywork parts other than as referred to above even without aerodynamic force measurement is within the definition of Restricted Aerodynamic testing.

## F4.6 Limits, Reporting, Inspection and Audit

- F4.6.1** The limits for RWTT and RCFDs are as set out in the tables below where:

- P is the F1 Team's final position in the Constructors' Championship of the previous year for the first 3 Aerodynamic Testing Periods, or the position in the current Constructors' Championship at the end of the last day of the third Aerodynamic Testing Period, for the last 3 Aerodynamic Testing Periods.
- C is the coefficient (expressed in percentage form) by which the various parameters need to be multiplied in order to obtain the individual RWTT and RCFD limits for each F1 Team. For RWTT Runs and RATGs the result of the multiplication will be rounded up to the nearest integer.

Wind tunnel limits for C=100%:		
RWTT Runs	#	320

CFD limits for C=100%:		
3D new RATGs used for solve or solve part of all RCFDs	#	2000

RWTT Wind On Time	hours	80	Compute used for solve part or parts of all RCFDs	MAUh	6
RWTT Occupancy	hours	400			

Coefficient C as a function of Championship position, P											
Championship Classification	P	1	2	3	4	5	6	7	8	9	10+ or New Team
Value of C	%	70	75	80	85	90	95	100	105	110	115

- F4.6.2** In the event that a change in ATR limits is applicable to a F1 Team after the start of an ATP, the change will be applied pro-rata according to the time remaining in the ATP during which the change occurs. At its absolute discretion and following a request from the F1 Team the FIA may permit over or under use of available Restricted Aerodynamic testing in the ATP during which the change occurred to be amortised or absorbed over the subsequent ATP.
- F4.6.3** In the event that the Championship order established at the end of the last day of the 3rd Aerodynamic Testing Period is subsequently changed following revisions to the results of a Competition or Competitions and therefore the limits applicable to certain F1 Teams change, the FIA will require F1 Teams to adjust Restricted Aerodynamic testing in order to comply with the revised limits from the start of the next ATP. At its absolute discretion the FIA may require or permit over or under use of available Restricted Aerodynamic testing in the ATP during which the change occurred to be amortised or absorbed before the end of the year.
- F4.6.4** Each F1 Team shall report to the FIA details of its RWTT and RCFDs for the preceding ATP within 14 days of the end of that ATP. The data must be provided in the exact format specified by the FIA, details of which may be found in the Guidance Documents (GD's).
- F4.6.5** Digital wind tunnel image files in colour and with sufficient unobstructed field of view of the wind tunnel working section to include the entire model must be recorded, referenced to other data collected and a copy saved including a unique time stamp to at least one second accuracy for the start of each individual run.  
Should the FIA wish to access the images for inspection at any time they must be of adequate quality such that it is possible to use them to verify, for example, whether the Front Wing (as described in Article C3.10 of the Technical Regulations) and Rear Wing (as described in Article C3.11 of the Technical Regulations) are fitted. In the case of other runs deemed to be non-RWTT in the context of this Article, for example using a RATG greater than 12 months old, or using the approved wing covers, the images must also provide a clear visual reference to assist in verifying this aspect of the test.

- F4.6.6** In order to permit RCFDs to continue across the end of an ATP an RATG that is used for solve or solve parts of RCFDs in an ATP may be used in any subsequent ATP subject to the requirements of Articles F4.1 and F4.4 above , without being counted again.
- F4.6.7** The complete surface mesh subject to the solver part or parts of each RCFD and any non-RCFD that includes a representation of an F1 car must be recorded and stored for a period of at least 24 months or until an earlier deletion is agreed by the FIA. It must be referenced to all data relating to the RCFDs or non-RCFDs including but not limited to solution monitoring data and any boundary condition of velocity and pressure profiles applied to the far field or domain boundaries and clearly and uniquely identifiable. It must be possible from these data to verify any changes made to the RATG and identify each individual flow solution generated using it. It must be possible to trace RCFDs used to generate velocity or pressure profiles applied as boundary conditions in subsequent sections or sub-models of the RATG that have not been counted as new RATGs.
- F4.6.8** A description correct at the start of the simulation or test of each RATG that is subject to RWTT or that is counted against the maximum permitted new RATGs for RCFDs in any ATP must be recorded with a clear description such that it is possible to easily identify the nature of the changes under evaluation. These descriptions will form part of the report required by Article F4.6.4 above.
- F4.6.9** In order to verify the Restricted Aerodynamic testing facilities employed by the F1 Teams and as a means of assuring common application of the restrictions set out in this Article, the FIA will arrange for independent benchmarking inspections of both wind tunnel and CFD activities to be carried out from time to time. Recommendations arising from these inspections will be incorporated into this Article.
- F4.6.10** Failure to comply with the limits of the ATR by a F1 Team will result in a reduction of the limits that will apply to subsequent ATP or ATPs for that F1 Team at the FIA's absolute discretion but by a minimum reduction equivalent to 10 multiples of the amount by which the relevant limit or limits were exceeded without prejudice to further appropriate action. (For example, if a F1 Team carries out 325 restricted wind tunnel runs against a maximum of 320 in an ATP, that F1 Team shall only be permitted to make 270 restricted wind tunnel runs during the next ATP).

#### **F4.7 Movement of Personnel**

No F1 Team may use movement of personnel involved in the development, design or testing of aerodynamic surfaces (whether employee, consultant, contractor, secondee or any other type of permanent or temporary personnel) with another F1 Team, either directly or via an external entity, for the purpose of circumventing the requirements of this Article. In order that the FIA may be satisfied that any such movement of staff is compliant with this Article, each F1 Team must inform the FIA of all relevant staff movements at the end of each ATP using the template which may be found in the Guidance Documents (GD's) and must demonstrate that they have implemented all reasonable measures to avoid the disclosure of information, data or designs between the F1 Teams involved.

**ARTICLE F5: POWER UNIT TEST BENCH RESTRICTIONS***[Advisory Committee: PUAC**Governance: PU Manufacturers' Governance Agreement / WMSC]***F5.1 Power Units Test Benches**

**F5.1.1** Restricted Power Unit Testing of Power Unit elements may only be carried out using Test Benches as defined in Articles F5.1.2, F5.1.3, F5.1.4, F5.1.5, F5.1.6 and F5.1.7, collectively referred to as “**Power Unit Test Benches (PUTBs)**”.

**F5.1.2 Single-Cylinder Dynamometer**

A “**Single-Cylinder Dynamometer**” is a test bench facility cell where a fired engine with only one cylinder representative of a Formula 1 engine can be tested. In addition to test bench components, this bench may include and is limited to the following Power Unit and car components:

- a. Items listed as “ICE” in column “PU ELEMENT” the table 1 of Appendix C4 of the Technical Regulations
- b. The clutch, flywheel and clutch actuation system.
- c. Fuel, engine oil and PU related liquids other than fuel and engine oil.
- d. The FIA Standard ECU
- e. The Lambda sensors as required by the Technical Regulations.

A Single-Cylinder Dynamometer must consist of a single mechanical input motor/absorber connected either directly, or through a test bench gearbox, to the single cylinder ICE output shaft.

**F5.1.3 Power Unit Dynamometer**

A Power Unit Dynamometer is a test bench facility cell where a fired engine, with more than one cylinder with or without all or part of the ERS system, representative of a Formula 1 Power Unit can be tested. In addition to test bench components, it may include and is limited to the following Power Unit and car components:

- a. Items listed as one of “ICE”, “EXH”, “TC”, “MGUK”, “ES” or “PU-CE” in column “PU ELEMENT” of table 1 of Appendix C4 of the Technical Regulations.
- b. The clutch, flywheel and clutch actuation system.
- c. Fuel, engine oil and PU related liquids other than fuel and engine oil.
- d. Secondary charge air coolers.
- e. The PU intake upstream of compressor inlet up to and including the air filter.
- f. The FIA Standard ECU.
- g. low pressure system downstream of and including the breakaway valve specified in Article C6.2.3 of the Technical Regulations.
- h. The regulatory fuel flow meter (FFM).
- i. Boost pressure measurement devices.
- j. The Lambda sensors as required by the Technical Regulations.

- k. the ICE-mounted hydraulic pump connected solely to a test bench circuit for emulation of hydraulic load.
- l. Up to twelve M12 studs used to connect the ICE to the survival cell or gearbox case.
- m. Additional items required for this test bench at the sole discretion of the FIA.

A Power Unit Dynamometer must consist of a single mechanical input motor/absorber connected either directly, or through a test bench gearbox, to the ICE output shaft. A pair of identical single mechanical input motors/absorbers coupled by means of a test bench splitter gearbox having a single connection to the single ICE output shaft will be considered compliant with this requirement.

#### F5.1.4 Power Train Dynamometer

A “**Power Train Dynamometer**” is a test bench facility cell where a Power Unit, a Formula One car gearbox and certain car components can be tested together. In addition to test bench components, it may include and is limited to the following Power Unit and car components:

- a. All Items listed in Article F5.1.3 of this Appendix.
- b. A Formula One car gearbox.
- c. Driveshafts and any components associated with their operation (such as joints, grease and housings).
- d. Heat exchangers for gearbox oil and accessories associated with their operation (including but not limited to housings, tubes, pipes, hoses, supports, brackets and fasteners).
- e. Heat exchangers and their associated accessories (including but not limited to housings, tubes, pipes, hoses, supports, brackets and fasteners).
- f. A representation of the surfaces of the chassis rearward of  $X_{pu} = -900$ .
- g. Bodywork or close representations of bodywork associated with the air intake and exit of heat exchangers and compressor inlet provided that this is for the sole purpose of representing air flow into or out of heat exchangers or the compressor inlet.
- h. Bodywork or close representation of bodywork and heatshields rearward of  $X_{pu} = -760$  or the rearmost surface of the seatback bulkhead, and for the sole purpose of representing the Power Unit thermal environment.
- i. Fuel system excluding the fuel tank which must be of a specification which cannot be used on a Current Car.
- j. Exhaust tailpipe.
- k. Hydraulic components listed in items 63~~2~~ (ICE-mounted hydraulic pump) and 66~~5~~ (Hydraulic system other than servo valve(s) and actuator(s)) of table 1 of Appendix C4 of the Technical Regulations.
- l. Additional items required for this test bench at the sole discretion of the FIA.
- m. Item 75~~4~~ (car looms) of table 1 of Appendix C4 of the Technical Regulations.

A Power Train Dynamometer must consist of a pair of identical single mechanical input motors/absorbers. A test bench splitter gearbox that connects two dyno motors/absorbers with a single ICE output shaft may be used in place of item b. above.

A Power Train Dynamometer may also be owned by the “Works” F1 Team supplied with the Power Units by the PU Manufacturer.

~~Non-works customer F1 Team may use the PU Manufacturer’s Power Train Dynamometer, or own or rent such a facility. Any testing for a non-works customer F1 Team is defined by Article F5.3.~~

#### F5.1.5 Full Car Dynamometer

A Full Car Dynamometer is a test bench facility cell where a complete Power Unit and car are tested together, except under the provisions of F5.1.9.d below, in order to test the Power Unit and the car systems. Selected components may be removed or replaced only to permit the mounting of the car on the dynamometer and reliable operation, subject to the prior approval of the FIA.

A Full Car Dynamometer must consist of a minimum of two single mechanical input motors/absorbers and may have up to one for each wheel of the car.

A Full Car Dynamometer may also be owned by the “Works” F1 Team supplied with the Power Units by the PU Manufacturer.

~~Non-works customer F1 Teams may use the PU Manufacturer’s Full Car Dynamometer, or own or rent such a facility. Any testing for a non-works customer F1 Team is defined by Article F5.3.~~ In the event that a Full Car Dynamometer facility is rented or owned by a non-works customer F1 Team and they elect to use this facility solely for the purposes permitted by Article F5.3.1.a, subject to the prior approval of the FIA, such facility may be used temporarily during maximum four separate periods of up to three weeks each per calendar year in addition to the Full Car Dynamometer already declared by the respective PU Manufacturer under Article F5.1.9.d.

#### F5.1.6 ES Test Bench

An ES Test bench is a test facility cell which can electrically test only the ES or an assembly of ES cells capable of storing a total amount of energy higher than 4MJ or supplying a DC voltage greater than 100V, in isolation. The unit under test must be connected to a dyno battery tester capable of dynamically discharging and charging the ES or the ES cells assembly and may be contained inside of the ESME or a dyno environmental or safety enclosure.

#### F5.1.7 ERS Test Benches

An ERS Test bench is a test facility that can test with an electrical DC current higher than 10A:

- a. The Energy Store (ES) and the MGU-K simultaneously or
- b. The MGU-K and the MGU-K control unit (CU-K) simultaneously or
- c. The MGU-K control unit (CU-K) and the Energy Store (ES) simultaneously or
- d. The MGU-K and the MGU-K control unit (CU-K) and the Energy Store (ES) simultaneously

No more than one of each element (MGU-K, CU-K, ES) can be installed and/or operated for testing within the test facility at any one time.

Any testing of the above components as part of a Power Unit Dynamometer, a Power Train Dynamometer or a Full Car Dynamometer is not considered an ERS Test Bench.

A PU Manufacturer may also have one additional Test Bench to test the Energy Store in isolation (An ES Test Bench).

**F5.1.8 Requirements for all PUTBs**

The following additional requirements apply to all PUTBs:

- a. Each PUTB must operate at a test cell pressure within +/-10mBar of ambient. However, methods to mimic a reduced ambient pressure at the air inlet or exhaust exits are permitted.
- b. Each PUTB must be stationary in space. Furthermore, engine or MGU-K output shafts must be horizontal
- c. There must not be any force actuators or suspension displacement actuators acting on the PUTB and any of the PU elements or car components under test.

Any Test Bench facility designed to emulate one of the PUTBs listed in this Article in such way as to circumvent the restrictions of this Article will not be allowed. Any functionality or additional test items required by a PU Manufacturer for one of the PUTBs must be authorised by the FIA at its absolute discretion, and (if accepted) will be communicated to all PU Manufacturers.

**F5.1.9 Limits on the number of Power Unit Test Benches and Declaration**

Before they can be used for Restricted Power Unit Testing each PU Manufacturer must submit, by 1 December of the preceding year, a declaration to the FIA of each PUTB that will be used for the development of the PU.

These PUTBs must comprise of up to a maximum of:

- a. Three Single-Cylinder Dynamometers
- b. Three Power Unit Dynamometers
- c. One Power Train Dynamometer
- d. One Full Car Dynamometer

If a PU Manufacturer does not declare another test bench facility cell as a Power Train Dynamometer according to (c) above this Full Car Dynamometer may also be used as a Power Train Dynamometer as described in Article F5.1.4.

- e. Two ERS Test Benches
- f. One ES Test Bench

This declaration must contain the following information:

- PUTB Name and ID
- Location & ownership
- Usage plan
- Description of its functionality

PU Manufacturers who also have a 2022 PU program, must provide details of the PUTBs used for the 2022 PU, even if they are not intended for 2026 PU development.

For the avoidance of doubt, the above submission must be made for any PUTB, including ones owned by a supplier or another legal entity.

A PU Manufacturer's Existing or Prospective Fuel/Oil Supplier is not permitted to operate a Power Unit Test Bench for the purposes of 2026 PU development or development of fuel and/or oil for the 2026 PU, with the exception of one Single-Cylinder Dynamometer exclusively for the development of fuel and/or oil, provided that it is one of the Single Cylinder Dynamometers declared by the Power Unit Manufacturer to FIA, pursuant to F5.1.9.a above.

For the avoidance of doubt, if the PU Manufacturer nominates an Existing or Prospective Fuel/Oil Supplier's Single-Cylinder Dynamometer as one of its allowance of three, it can be used with any type of engine. That engine can only be produced using information from published regulations and Existing or Prospective Fuel/Oil Supplier's Intellectual Property and it may not include any Intellectual Property IP from the PU Manufacturer except permitted by the Technical Regulations Appendix C8 Article 2.2.1b.

In addition, The PU Manufacturer must procure that their Existing or Prospective Fuel/Oil Supplier shall provide full access to engine data, engine design, engine Intellectual Property IP and inspection when requested by the FIA.

Any other Test Benches, which may be deemed to offer similar benefits, must also be declared.

During a calendar year, the PU Manufacturer may change the PUTBs in use at any time (as limited for each PUTB type by Articles F5.1.2, F5.1.3, F5.1.4, F5.1.5, F5.1.6 and F5.1.7) in order to allow for any commissioning or decommissioning of PUTBs, a facility relocation or because of any force majeure reasons. Such changes of declared PUTBs must be first agreed with the FIA and an updated declaration submitted in order to ensure that no competitive advantage is obtained, and that the intention of the limits imposed in Articles F5.1.2, F5.1.3, F5.1.4, F5.1.5, F5.1.6 and F5.1.7 are not circumvented.

Details of the process for Declaration of PUTBs may be found in the Guidance Documents (GD's).

## F5.2 Power Unit Test Benches Operational Restrictions

### F5.2.1 Testing Periods

The usage of PUTBs has an annual limit (defined in Article F5.2.7) and is furthermore controlled by five Testing Periods of ten working weeks each. The calendar will be shared by the FIA at the end of the previous year.

### F5.2.2 PUTB usage monitoring

PU Manufacturers are required to carry out a detailed monitoring and recording of the activity of their PUTBs by using FIA-approved hardware and software. Details of this software and hardware may be found in the Guidance Documents (GD's).

Any work carried out for the 2022 PU (defined in Appendix F1B) will be considered as work for the 2026 PU, and hence bound by the provisions of Article F5, unless the PU Manufacturer can demonstrate to the FIA that the work was carried out solely for the development of the 2022 PU. The FIA will issue guidance about the criteria that need to be satisfied and the information that needs to be provided in order to prove this. Such information may include Power Unit parameters (e.g., fuel flow, rpm, power) and a detailed description of the complete BOM of the 2022 PU elements that are being tested. This guidance may be found in the Guidance Documents (GD's).

In all cases, and for each PUTB, photographs clearly showing the contents of the PUTB must be captured every 10 minutes on a continuous basis and retained for a minimum of 2 years, and component identification records must be retained to enable the FIA to confirm the Power Unit Test Bench definition and the purpose of testing.

In order to check on the hardware employed by the PU manufacturers and as a means of assuring common application of the restrictions set out in this Article F5, the FIA will arrange for benchmarking inspections of Power Unit Test Benches activities to be carried out from time to time.

PUTB activity records for year N must be retained until the end of year N+2.

#### F5.2.3 PUTB usage declaration

No later than 2 weeks after the end of each Testing Period, each PU Manufacturer must submit a declaration for the testing that took place in the period just ended.

Details about the declaration format, and any information that needs to be supplied, can be found in the Guidance Documents (GD's).

#### F5.2.4 Restricted PUTB testing

Restricted PUTB Testing is any testing by a PU manufacturer, or any Related Party of that PU manufacturer, or any agent or sub-contractor of the PU manufacturer or any of its Related Parties, in a test environment of a complete or incomplete PU, but always including the engine or the ERS, in order to measure the torque produced by this assembly or any parameters related to the function of this assembly.

Restricted PUTB Testing is limited by PUTB Operation Hours and PUTB Occupancy Hours, defined below.

#### F5.2.5 PUTB Operation Hours

For each Power Unit Dynamometer, Power Train Dynamometer and Full Car Dynamometer, the Test Bench Operation hours will be the time when the Engine speed exceeds 7500rpm.

In any Testing Period, the total sum of the Operation Hours of all such PUTBs will be considered as the “**ICE Operation Hours**” for this period.

For the avoidance of doubt, the following will not count towards the ICE Operation Hours defined above:

- ICE motoring, i.e., any activity done on a PUTB with no ignition and not showing any positive torque for the whole recorded activity.
- Single-Cylinder Dynamometer testing.

~~For the ERS Test Benches, the Test bench Operation hours will be the time when both of the following conditions apply:~~

- a. ~~The DC current in or out of the Energy Store (ES), or its emulator, exceeds 10 Amps; and~~
- b. ~~Two or more different elements get tested, as per the requirements of Article F5.1.7.~~

~~In any Testing Period, the total sum of the Operation Hours of all such PUTBs will be considered as the “**ERS Operation Hours**” for this period.~~

#### F5.2.6 PUTB Occupancy Hours

The Test Bench Occupancy hours are counted separately for each PUTB, and the cumulative total is considered for the limits defined in Article F5.2.7.

For each Power Unit Dynamometer, Power Train Dynamometer or Full Car Dynamometer, its Occupancy hours start being incremented when, for the first time in a calendar day it exceeds 1000rpm, and stop being incremented when it drops below 1000rpm for the last time in the same calendar day.

ICE motoring i.e., any activity done on a PUTB with no ignition and not showing any positive torque for the whole recorded activity, carried out within the same calendar day, but outside the time interval indicated above, will not be counted towards the Occupancy hours of these PUTBs.

In any Testing Period, the total sum of the Occupancy Hours of each such PUTB will be considered as the “**ICE Occupancy Hours**” for this period.

~~For each ERS Test Bench, its Occupancy hours start being incremented when, for the first time in a calendar day the DC current in or out of the Energy Store (ES), or its emulator, exceeds 10 Amps, and stop being incremented when this current drops below 10 Amps, for the last time in the same calendar day.~~

~~In any Testing Period, the total sum of the Occupancy Hours of each such PUTB will be considered as the “**ERS Occupancy Hours**” for this period.~~

If a PUTB test crosses midnight Test Bench Occupancy hours will both stop and start being incremented again from midnight.

#### F5.2.7 Limitations in Restricted PUTB testing

In each year, the limits of PUTB testing for the 2026 PU are summarised in the following table:

Operation hrs / year	(2022)	(2023)	(2024)	(2025)	2026	2027	2028	2029	2030
New PU Manufacturers after 2026	N-4	N-3	N-2	N-1	N				
2026 PU limit - ICE	300	5430 *			710	410	410	410	410
<del>2026 PU limit - ERS</del>	<del>200</del>	<del>3430 *</del>			<del>510</del>	<del>410</del>	<del>410</del>	<del>410</del>	<del>410</del>

\* These limits are cumulative over the three years, N-3, N-2, N-1

The following provisions and explanatory notes also apply:

- For ICE testing, the following formula defines the limit in ICE Occupancy Hours:
- [ICE Occupancy Hours] = [ICE Operation Hours] x 8
- ~~For ERS testing, the following formula defines the limit in Occupancy Hours:~~
- ~~[ERS Occupancy Hours] = [ERS Operation Hours] x 5~~
- PU Manufacturers who satisfy the criteria laid out in Article 4 of Appendix C5 of the Technical Regulations for “Additional Development and Upgrade Opportunities” (ADUO), will be granted

an additional 30% in ICE Operation Hours in the 12-month period starting a week after the 5th Competition in the year when the criteria for ADUO are met.

- e. For the period N-3, N-2, N-1, each year will have individual ICE Operation hours and ICE Occupancy hours limits equal to 40% of the total cumulative allowance for these three years.
- f. From 2026 onwards, each Reporting Period, as defined in Article F5.2.1, will have individual ICE Operation hours and ICE Occupancy limits equal to 24% of the annual limit.
- g. New PU Manufacturers, intending to homologate Power Units for the first time in year N, but in any case, after 2026, will be granted the Operation hours indicated respectively in the N-4, N-3, N-2, N-1 and N columns for each of these years before the year of first homologation of a PU in the Formula 1 Championship.

#### F5.2.8 Unrestricted PUTB testing

The following activity may be partially or fully excluded from the restricted PUTB testing outlined above:

FIA project: Activity on a Power Unit Dynamometer or a Power Train Dynamometer specifically authorised as part of an approved FIA Project as defined in the Power Unit Financial Regulations and at the sole discretion of the FIA, provided any such testing is not contrived to provide any benefit for power unit development save only for minimal and incidental information collected during the test through the operation of the PU according to the FIA Project approval.

#### F5.2.9 2022 PU Testing

Further to the provisions of Article F5.2.2, and for the avoidance of doubt, PUTB testing restrictions for the 2022 PU are provided by the 2022-2025 Sporting Regulations, and any definitions, criteria and guidance given in those Sporting Regulations do not apply to the 2026 PU if they contradict definitions given herein.

However, it remains the responsibility of the PU Manufacturer to satisfy the FIA that any 2022 PU work does not in any way contribute to the 2026 PU program.

### F5.3 Power Unit Test Bench activities affecting PU Manufacturers and F1 Teams

#### General Principles

F5.3.1 The objective of any provisions affecting PUTB activity is to ensure that no F1 Team or PU Manufacturer is at a competitive advantage or disadvantage with respect to other F1 Teams or PU Manufacturers, with respect to their treatment by the Sporting Regulations, Technical Regulations, Financial Regulations-F1Teams, Financial Regulations-PU Manufacturers, and Operational Regulations.

More specifically:

- a. Works F1 Teams and Customer F1 Teams shall have equal or very similar testing opportunities, with respect to the development of chassis components that need to be tested on a PUTB.
- b. PU Manufacturers with a higher number of Customer F1 Teams to whom they supply PUs shall have no advantage with respect to the dyno hour limits outlined in Article F5.2.7, when compared to PU Manufacturers with a lower number of Customer F1 Teams to whom they supply PUs.

- c. Customer F1 Teams shall have the opportunity to use a fuel that is supplied by a different fuel supplier to that of the Works F1 Team using the same Power Units. The testing required for such fuel shall give no advantage or disadvantage to the PU Manufacturer in question.

The above principles concern solely the competitive advantage or disadvantage that could be obtained by a PU Manufacturer or F1 Team engaged in PUTB activities, and not any commercial arrangements made between PU Manufacturers and F1 Teams to carry out PUTB activities.

It is acknowledged that perfect achievement of the above objectives may not be possible at all times. The FIA, the PU Manufacturers and the F1 Teams will engage in good faith discussions to make amendments to these Regulations should it emerge that these objectives are not met.

**F5.3.2** In respect of activities undertaken to test and develop a PU the following PUTB activities will be considered as being for the “Sole Purpose of Testing Power Units for Performance and Reliability”:

- a. The undertaking of any tests on a Single-Cylinder Dynamometer;
- b. The undertaking of any tests on a Power Unit Dynamometer, Power Train Dynamometer or ERS Test Bench, provided that the specification of the car components ~~used~~needed for the operation of the test ~~remains~~is:
  - i. of the same specification last used in the previous calendar year or
  - ii. of a specification used prior to that last used in the previous calendar year or
  - iii. of either of a maximum of two additional specifications that ~~has~~are been changed in specification ~~no more than twice per~~ permitted during the calendar year ~~and~~with only following the express permission of the FIA; ~~and~~
- c. The undertaking of any tests on a Power Unit Dynamometer, Power Train Dynamometer or ERS Test Bench where:
  - i. the specification of any of the chassis components ~~do not remain of the same specification last used in the previous calendar year and has~~been changed in specification beyond what is permitted within subclauses (b)(i),(ii) and (iii) of this definition; and
  - ii. the specification of any of the Power Unit components ~~do not remain of the same specification last used in the previous calendar year, nor of a specification used prior to that last used in the previous calendar year nor a specification that is homologated or can be satisfactorily demonstrated to the FIA to be intended for homologation.~~

for the purpose of this subclause (c) only, the criterion of “Sole Purpose of Testing Power Units for Performance and Reliability” will be considered met only and exclusively in respect of the bill of materials cost of the Power Unit components installed and being tested.

**F5.3.3** Additional PUTB testing opportunities for Customer F1 Teams

For the avoidance of doubt, the provisions of this Article F5.3.2 regard Competitors using a particular Power Unit but not nominated as a “works/factory” F1 Team under the provisions of Article 1.2.1 of Appendix C8 of the Technical Regulations [Reference to be updated when this Appendix is moved to Section A of the Regulations].

- F5.3.3.1** Should a PU Manufacturer provide PU's for use during the 2026-2030 Championships to customer Competitors who design any of their own car components, a quota of ~~3045~~ additional Operation Hours and proportional Occupancy Hours will be allocated per calendar year and per additional customer Competitor. This quota to be used only during a maximum of six separate periods of up to three weeks each for PUTB testing in combination with a ~~2026~~ PU on a Power Unit Dynamometer, Power Train Dynamometer or a Full Car Dynamometer under the provisions of Articles F5.1.3, F5.1.4 and F5.1.5 subject to agreement with the PU supplier and the FIA.

Additional PUTB Testing granted under the provisions of this Article is the only PUTB Testing that a PUM is permitted using any proprietary car components, software or settings from any Customer F1 Team. Car components, software or settings used for any other PUTB Testing that does not fall within these permitted additional Operation Hours must be those of the Works F1 Team.

Exceptionally, in case of serious and demonstrated safety or reliability issues with or directly attributed to the effects of a Customer F1 Team's car components software or settings on the PU, the FIA may, at its sole discretion, authorise a PUM to conduct further PUTB Testing using car components, software or settings from a Customer F1 Team by increasing the quota of hours permitted by this Article.

Such tests will only be performed for one or more of the following reasons:

- For the Power Unit and Power Train Dynamometer: approval (sign-off) of the F1 Team's components tested
- For the Full Car Dynamometer: confirmation and setup of the overall car systems
- For both the three types of PUTB: evaluation of the effects of the F1 Team's components on the PU's performance and reliability

For any PUTB testing performed under the provisions of this Article to not count towards the limits defined in Article F5.2.7 for the PU Manufacturer, the PU Manufacturer must be able to demonstrate to the FIA's satisfaction that no PU development activity is undertaken in conjunction with these tests.

- F5.3.3.2** Should a PU Manufacturer provide PU's for use during the 2026-2030 Championships to a customer F1 Team who wishes to enter into a supply agreement with an alternative fuel supplier to whom supplies the Works F1 Team of the PU Manufacturer, the following additional PUTB testing will be permitted, outside the PU Manufacturers available PUTB hours defined in Article F5.2.7:

- Up to 120 additional Operational Hours per year on a Power Unit Dynamometer
- Up to 50 Operational Hours per year on a Single-Cylinder Dynamometer will be accepted for the purposes of this work. An FIA-approved monitoring system, as defined in Article F5.2.2 must be fitted to monitor this activity.

The following additional provisions apply to this Article:

- The provisions of this Article are solely intended to allow customer F1 Teams to seek alternative fuel suppliers. Under no circumstances will it be accepted that such an alternative fuel supply is organised in such way as to directly or indirectly increase the PUTB testing opportunities for the PU Manufacturer or its main fuel supplier. For any PUTB testing performed under the provisions of this Article to not count towards the limits defined in Article F5.2.7 for the PU Manufacturer, the PU Manufacturer must be able to demonstrate to the FIA's satisfaction that

no PU development activity is undertaken in conjunction with these tests, other than what is strictly necessary for the tuning of the PU to the characteristics of the fuel used.

- d. No additional PUTB hours will be granted if the alternative fuel supplier also supplies engine oil to the F1 Team in question.
- e. If more than one customer F1 Teams using the same PU enter into an agreement with the same alternative fuel supplier, the additional PUTB hours stipulated in this Article will be shared between those customer F1 Teams.
- f. For the avoidance of doubt, should the “works/factory” F1 Team of the PU Manufacturer change fuel supplier, no additional PUTB hours will be allocated.

## APPENDIX F1: DEFINITIONS

### PART A: GENERAL DEFINITIONS

[*Advisory Committee: TAC Governance: F1 Commission / WMSC*]

**“Aerodynamic Testing Restrictions (ATR)”** refers to the measures in force that limit the aerodynamic development activities of the *F1 Teams*, in respect of Wind Tunnel testing and of CFD. Such measures are in force to control the costs and limit the escalation of activities that *F1 Teams* engage in to develop the aerodynamics of their *F1 Car*.

### PART B: DEFINITIONS APPROVED UNDER THE PROVISIONS OF THE PU GOVERNANCE AGREEMENT

[*Advisory Committee: PUAC Governance: PU Manufacturers’ Governance Agreement / WMSC*]

**“Power Unit”** has the meaning set out in the Technical Regulations in force during the applicable Reporting Period.

**“Power Train Dynamometer”** has the meaning set out in the Operational Regulations in force during the applicable Reporting Period.

**“Power Unit Supply Perimeter”** has the meaning set out in the Operational Regulations in force during the applicable Reporting Period.

**“Power Unit Dynamometer”** has the meaning set out in the Operational Regulations in force during the applicable Reporting Period.

**“Single Cylinder Dynamometer”** has the meaning set out in the Operational Regulations in force during the applicable Reporting Period.

**“2022 PU”:** Power Unit designed to comply with the 2022-2025 Technical Regulations

**“2026 PU”:** Power Unit under development, intended to comply with the 2026-2030 Technical Regulations, including any preliminary components or work leading to that ultimate goal.

### APPENDIX F2: APPROVED CHANGES TO SECTION F FOR SUBSEQUENT YEARS

#### Changes for 2027

- None

#### Changes for 2028

- None

#### Changes for 2029

- None