PF WEBINAR

03.03.2022

A WORLD IN MOTION

FEDERATION
INTERNATIONALE
DE L'AUTOMOBILE

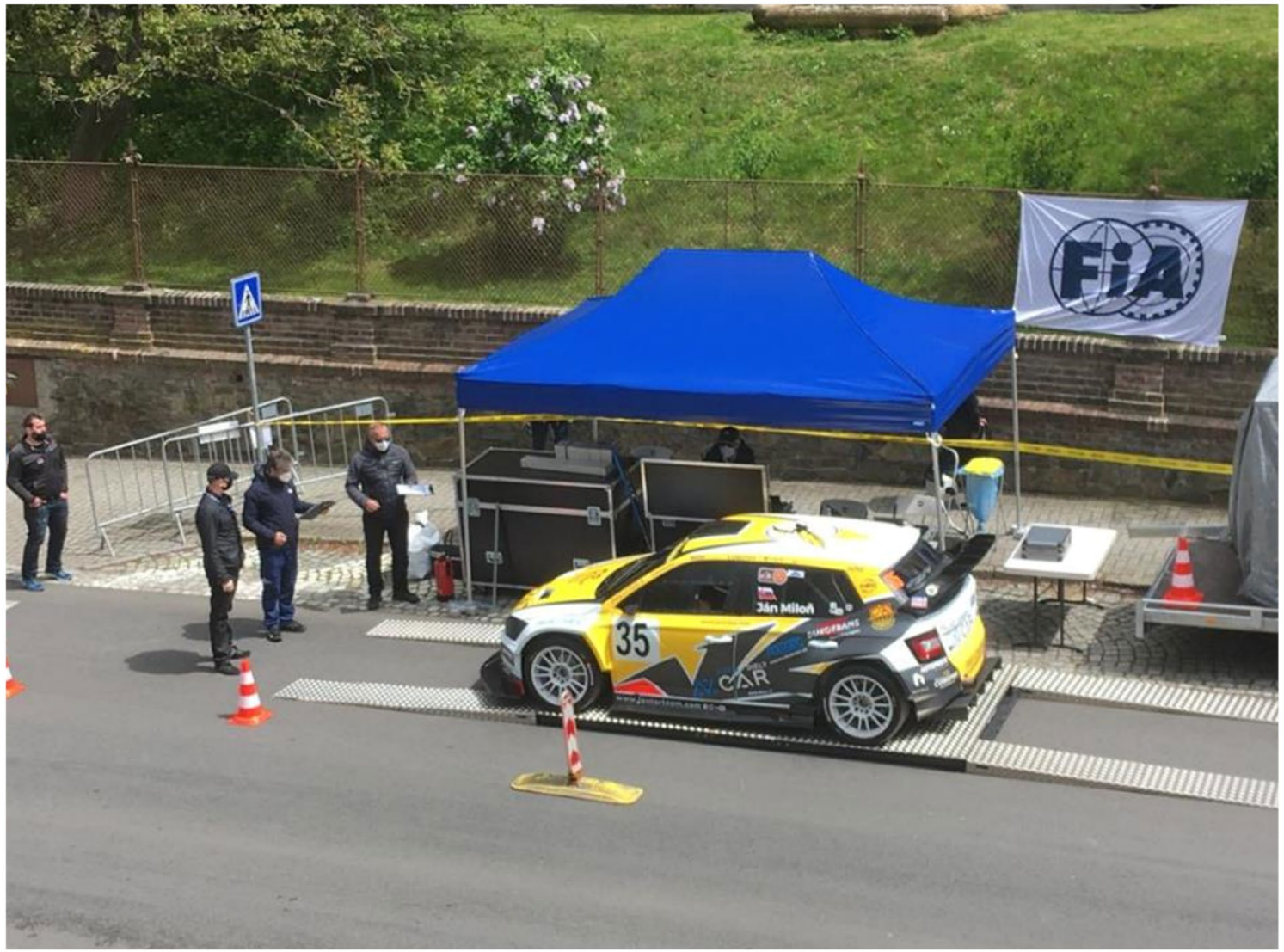
FIA.COM

AGENDA

1. Introduction to 2022
2. Changes to the Regulations for 2022
3. Changes to the Pf Calculation for 2022
4. FIA Scrutineering Equipment
5. Questions from ASNs
6. Webinar - Q&A

1. INTRODUCTION TO 2022

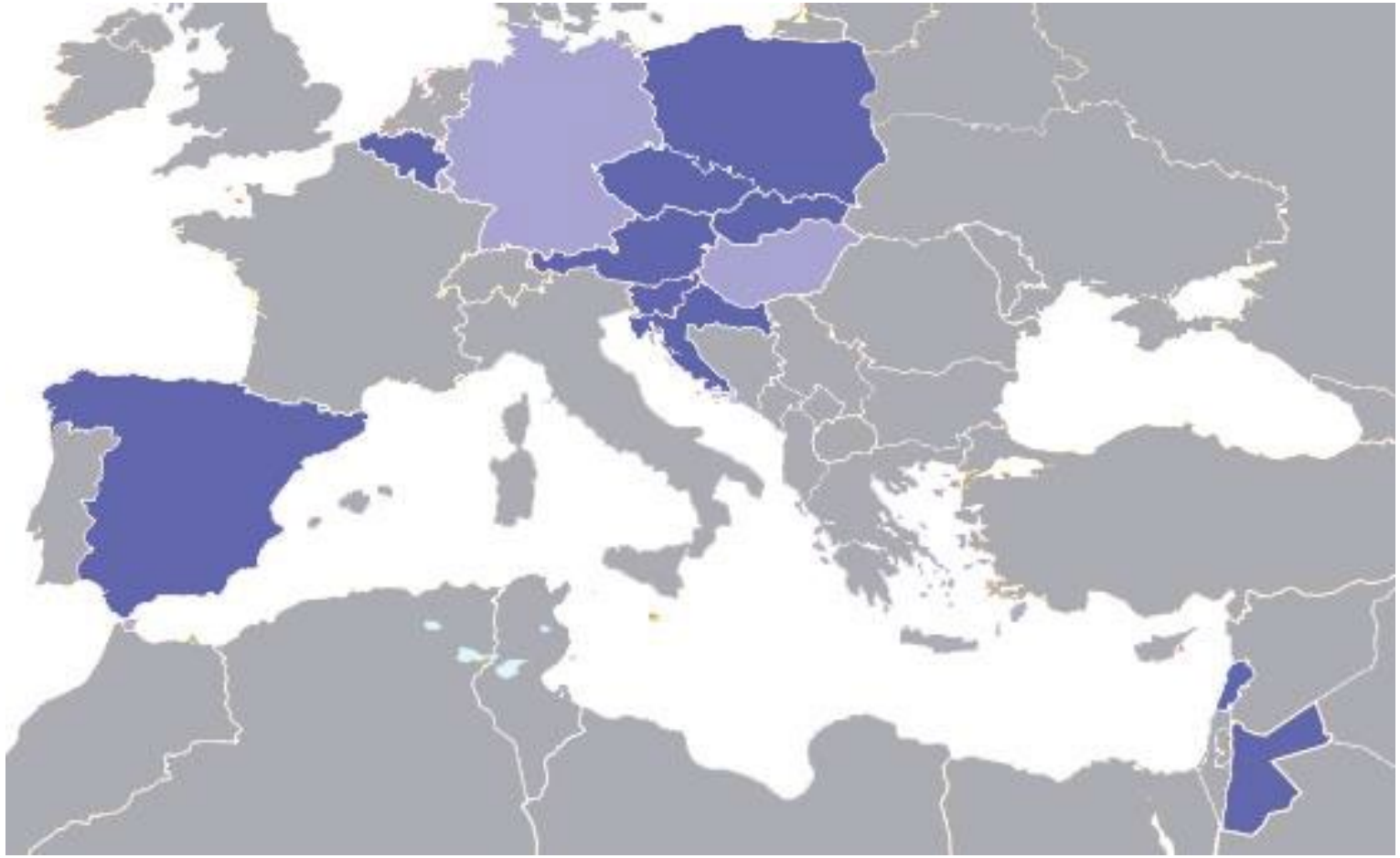
2021



2023

2023

Overview



Austria
Belgium,
Czech Republic
Croatia
Jordan
Poland
Lebanon
Slovakia
Slovenia
Spain

Germany (testing in 2022)
Hungary (in Slalom)

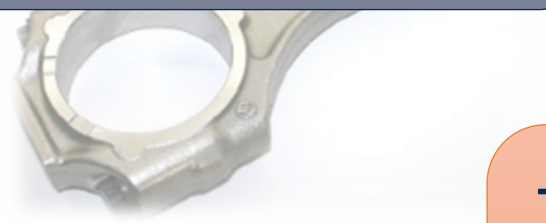
Countries where Pf is applied at national level in 2022.

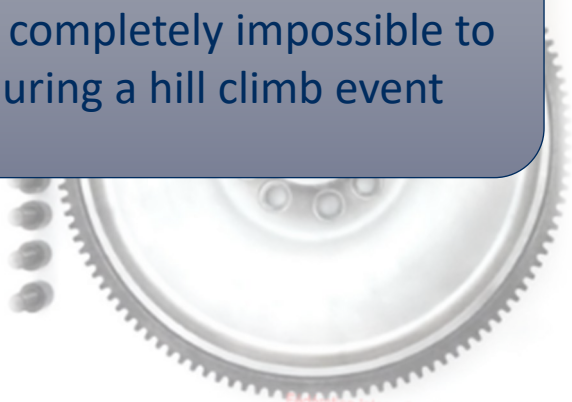
Countries in which the Pf is being tested or applied in another discipline.

Performance Factor

The latest car models are not FIA homologated

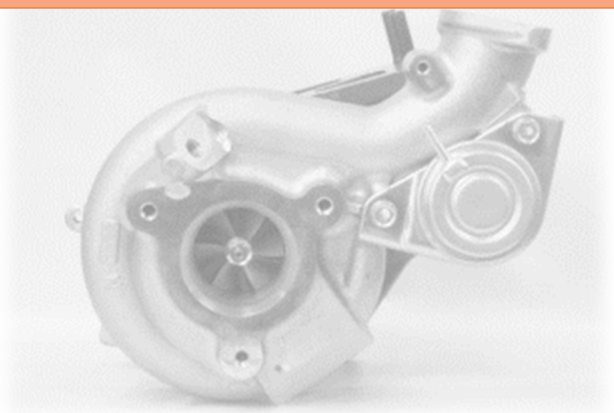
Most checks on a homologated car are completely impossible to do during a hill climb event





The European version of the Nissan Sunny had a cast iron exhaust as standard, but the Japanese version had a stainless-steel exhaust as standard.

Precise and correct information on standard road cars is almost impossible to access

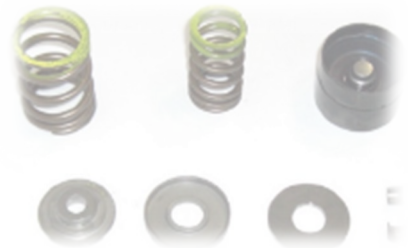


What cannot be checked with certainty is left free.

Performance Factor

A FIA group N homologation form contains about 120 articles and photos

A FIA group A homologation form contains about 220 articles and photos



Renault Clio 5433 homologation form contains:

- 34 Option Variants
- 11 Errata
- 4 Evolutions
- 2 Supply Variants
- 2 Kit

TOTAL 187 pages!

Performance Factor

Engine
23 inputs

Racing weight

Drivetrain
5 inputs

Chassis
5 inputs

Aerodynamics
11 inputs

Only 45 parameters would NEVER be enough to calculate the performance of the car

Needs some assumption on the preparation level

Performance Factor

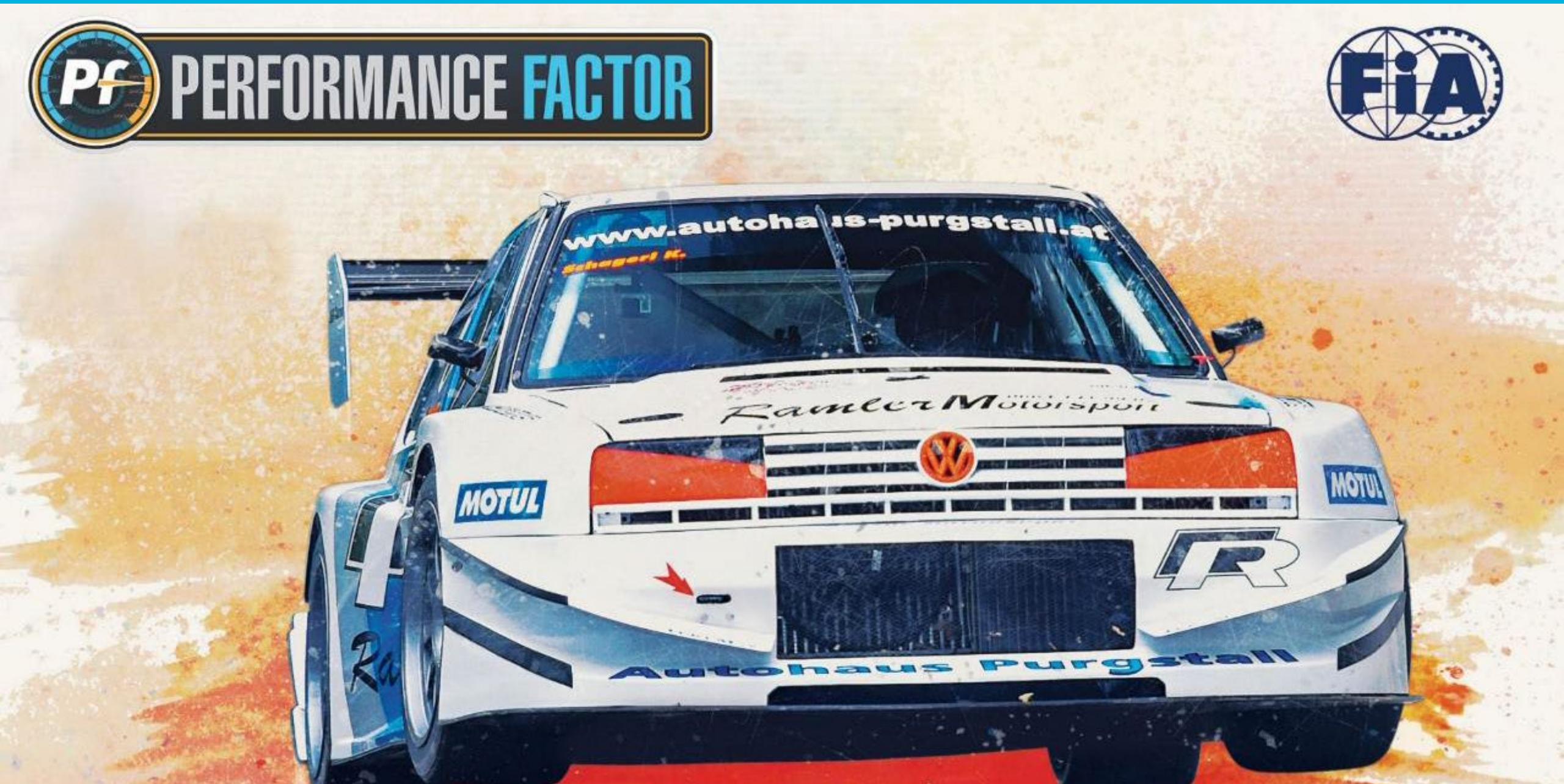
- ✓ Racing weight
- ✓ Engine displacement
- ✓ Engine maximum RPM
- ✓ Compression Ratio
- ✓ Gearbox shift mechanism
- ✓ Etc…

inputs **clearly related** to car performance

inputs related to **assumptions on the level of preparation of the car**

- ✓ Engine block or Exhaust type
- ✓ Engine dry or wet sump
- ✓ Wheel attachment
- ✓ Wheelbase variation
- ✓ Etc…

PERFORMANCE FACTOR



2. CHANGES TO THE REGULATIONS FOR 2022

Bodywork around the wheels

Art.2.2.2 2021

With the front wheels aligned to proceed straight ahead, the part of each complete wheel and its fixings situated above the plane passing through the axle centreline, must not be visible from above ~~or from the rear~~.

2022

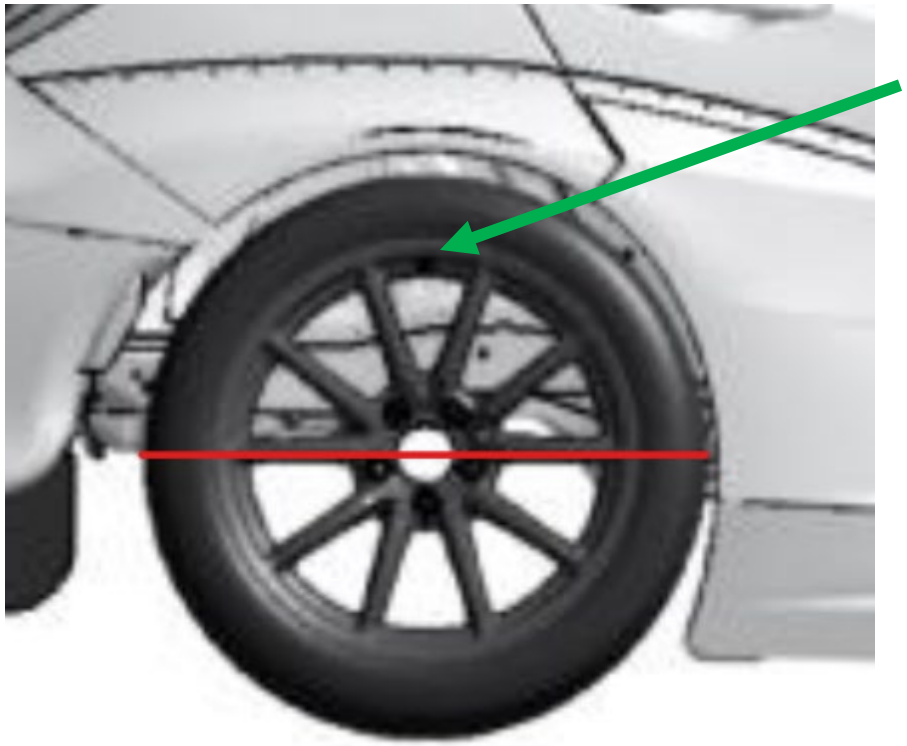
Art.2.2.2 2022

With the front wheels aligned to proceed straight ahead, the part of each complete wheel and its fixings situated above the plane passing through the axle centreline must not be visible from above.

- ✓ **BODYWORK AROUND THE WHEELS**
- ➢ ENGINE LOCATION
- ➢ OIL CATCH TANK

Bodywork around the wheels

With the car on horizontal surface with a plumb bob from the fender to the plane passing through the axle centreline.



Not visible from above

This area now free

Check on both sides for surface horizontality errors.

Engine location

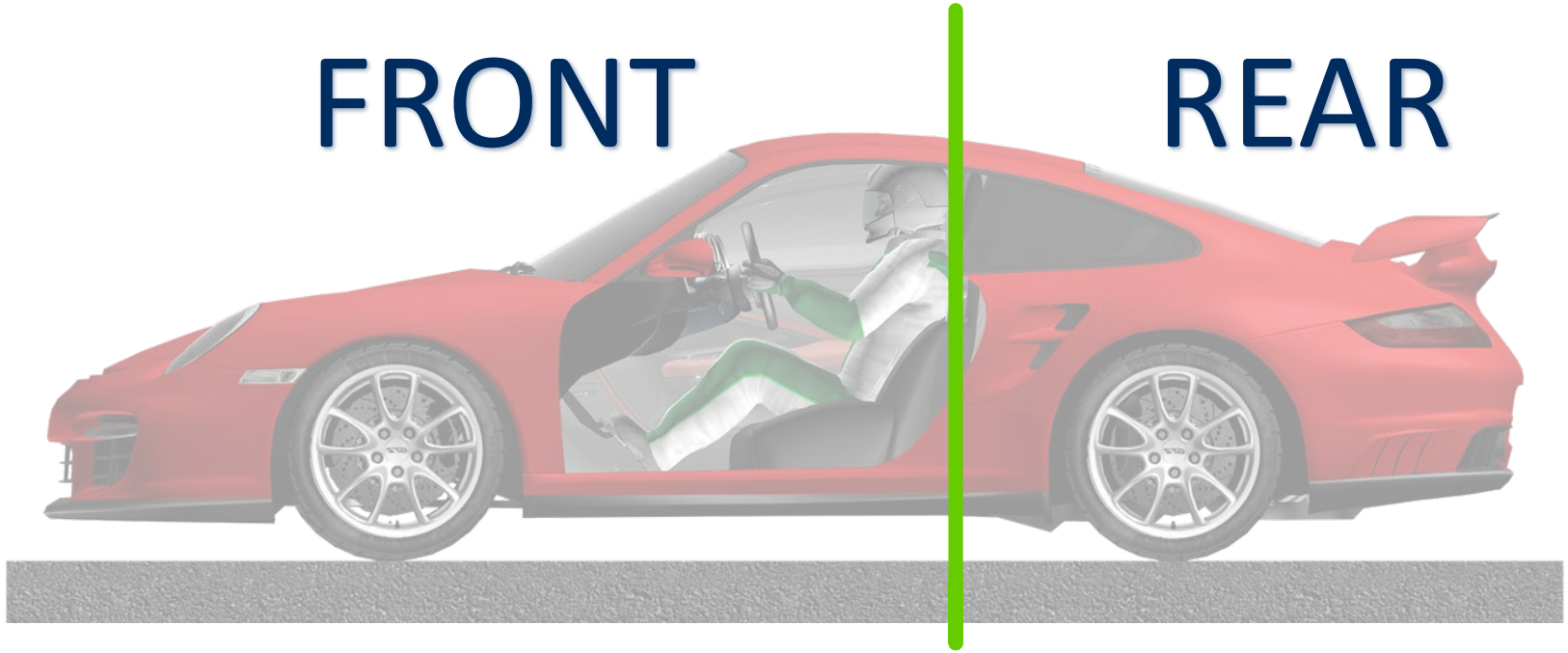
Art.2.3.1 2021
Engine location is as in the base model of the car. Position and orientation are free.

2022

Art.2.3.1 2022
…
Engine location, relative to the driver, is as in the base model of the car. Position and orientation are free.

- ✓ BODYWORK AROUND THE WHEELS
- ✓ **ENGINE LOCATION**
- ➢ OIL CATCH TANK

The engine location is free but the base model longitudinal position, relative to the driver, must be maintained.



Catch tank

Art.2.3.1 2021

The oil catch tank must have a capacity of 2 litres for cars with a cubic capacity equal to or below 2000 cm3, and 3 litres for cars with a cubic capacity of over 2000 cm^3.
This container must be either made out of translucent plastic or must include a transparent window.
An air/oil separator can be mounted outside the engine (maximum capacity 1 litre), in accordance with Drawing 255-3.

2022

Art.2.3.1 2022

If the lubrication system includes an open type sump breather, it must be equipped in such a way that the oil flows into a catch tank.
The oil catch tank must have a capacity of 2 litres for cars with a cubic capacity equal to or below 2000 cm3, and 3 litres for cars with a cubic capacity of over 2000 cm^3.
This container must be either made out of translucent plastic or must include a transparent window.
An air/oil separator can be mounted outside the engine (maximum capacity 1 litre), in accordance with Drawing 255-3.

- ✓ BODYWORK AROUND THE WHEELS
- ✓ ENGINE LOCATION
- ✓ **OIL CATCH TANK**

It is to be consistent with Appendix J Art.255-5.1.14

3. CHANGES TO THE PF CALCULATION FOR 2022

CHANGES TO PF REGULATIONS IN 2022

(Appendix 6)

- **General Tolerances**

- **Engine PF**
  - Engine block and exhaust type NEW
  - Surge Channel or Ported Shroud NEW
  - Engine restrictor
  - Exhaust catalyst

- **Aero PF**
  - Splitter ahead the bumper

- **Chassis PF**
  - Chassis Type
  - Bodywork material NEW
  - Windscreen material

Tolerances

- ✓ **TOLERANCES**
- ➢ ENGINE PF
- ➢ AERO PF
- ➢ CHASSIS PF

General Principle:

- ✓ *Reduction of tolerances*
- ✓ *Maximum and minimum values have no tolerance.*

2021

- Race weight: +100 / - 10 kg
- Engine Bore: +/- 0.25 mm
- Engine Displacement: +/- 1 %
- Throttle body diameter: +0.2 mm/ free
- Turbo inducer diameter: +0.2 mm/ free
- Restrictor diameter: +0.1 mm/ free
- Engine speed: + 500 rpm

- Compression ratio: +0.1/free

- Splitter ahead the bumper: +/- 20 mm

2022

2022

- Race weight: +100 / - 0 kg
- Engine Bore: +/- 0.20 mm
- Engine Displacement: +/- 0.7 %
- Throttle body diameter: maximum
- Turbo inducer diameter: maximum
- Restrictor diameter: maximum
- Engine speed: maximum
- (approximation to nearest 100 rpm)
- Compression ratio: maximum

- Splitter ahead the bumper: +0 /- 50 mm

Engine block and exhaust type

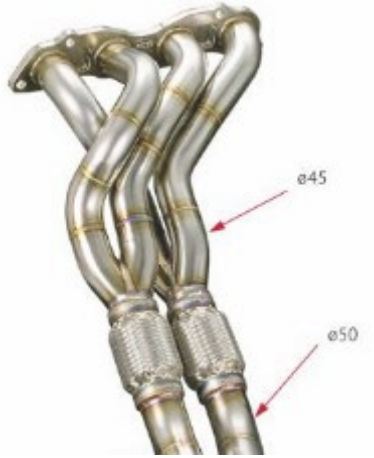
Art. 4.2.4- 2021
The type of engine block (from a Series Production or Custom) is the part considered in this factor.

2022

Art.4.2.4 2022
Custom, if the engine block comes from a racing engine designed exclusively for racing or the material of the exhaust manifold is not cast iron (except when the exhaust manifold is integrated into the cylinder head).

It will be "custom" if exhaust manifold is made of steel pipes,
the origin of the manifold production or aftermarket is not important

OR

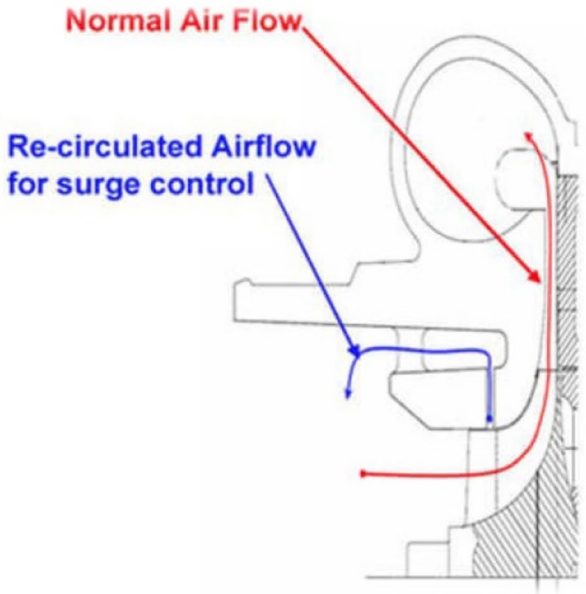


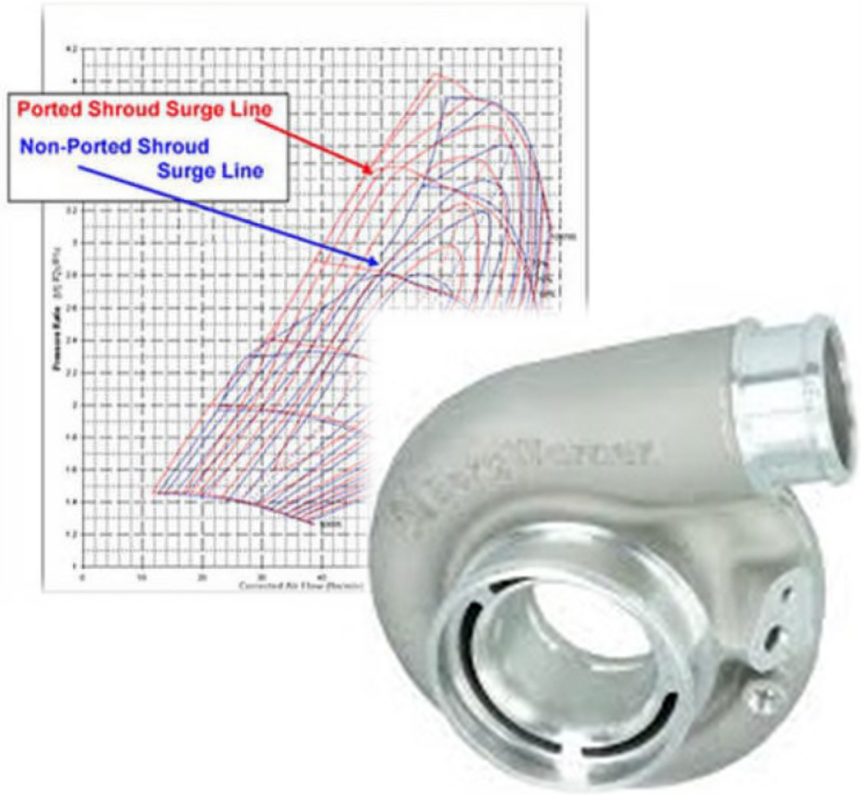
Surge Channel or Ported Shroud

Art.4.2.15b NEW 2022

Surge Channel or Ported Shroud Check (Yes or No)

Yes Checked, If any channel present bypasses the declared inducer diameter and could allow air to bypass the inducer in a forced induction engine.





Engine restrictor

Art. 4.2.16- 2021

This uses the Competitor's declared maximum restrictor dimension.

2022

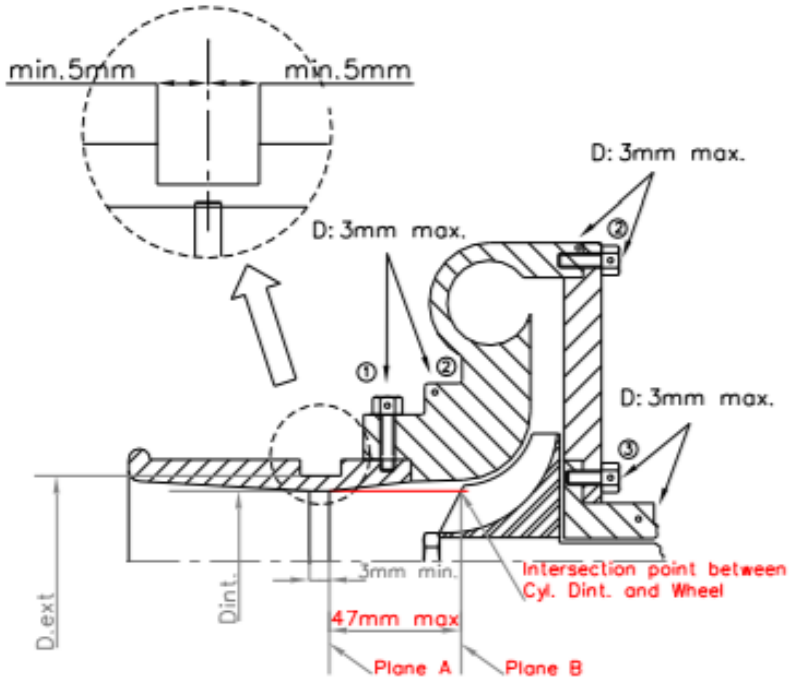
Art.4.2.4 2022

Is the diameter of the restrictors in mm.

The declared restrictor geometry must conform to drawing 254-4.

Any other restrictor will not be considered for the Pf calculation.

The only exception to this position is when a car, for use in a recognised FIA or ASN series, has a restrictor homologated in a different position.

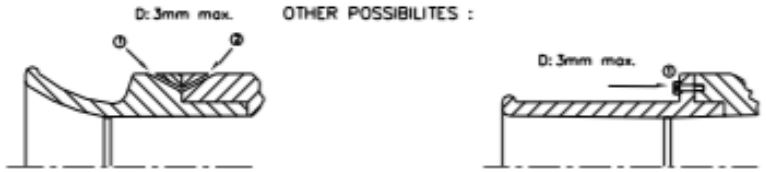


① trou pour bride ou bride/carter de compression
hole for restrictor/compressor housing

② trou pour carter de compression ou carter/flasque
hole for compressor housing or housing/flange

③ trou pour carter central ou carter/flasque
hole for central housing or housing/flange

AUTRES POSSIBILITES :
OTHER POSSIBILITES :



254-4

Exhaust Catalyst

PF web site - 2021

Specify if the vehicle is fitted with a post-combustion catalytic anti-pollution system, or for diesel engines, a particulate filter.

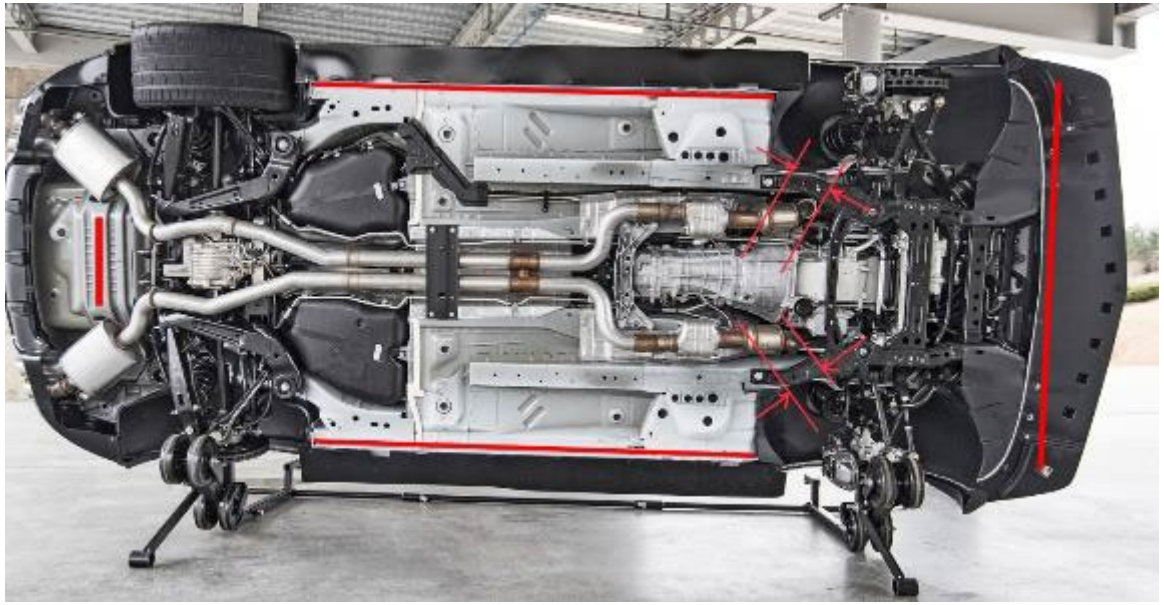
2022

Art.4.2.18 - 2022

Specify if the vehicle is fitted with a post-combustion catalytic anti-pollution system, or for diesel engines, a particulate filter.

A catalytic converter will be considered for inclusion in the Performance Factor calculation if the complete core is within 1000 mm of the cylinder block.

Note: this distance is measured directly between the core and the cylinder block, not along the exhaust pipe length.



Splitter ahead the bumper

PF web site - 2021

Ground distance, in mm, between the foremost point of the bodywork and the foremost point of the splitter, rounded off to the nearest mmn(zero if there is no splitter)

2022

Art.4.2.18 - 2022

The maximum horizontal distance, in mm, between the foremost point of the bodywork and the foremost point of the splitter, measured within 300 mm of the centre line, rounded off to the nearest mm (zero if there is no splitter).

- ✓ TOLERANCES
- ✓ ENGINE PF
- ✓ **AERO PF:**
- ✓ **Splitter ahead the bumper**
- ➢ CHASSIS PF

Chassis Type - Clarification

DEFINITIONS (as Art.251-2.5.1, 2.5.2 and 2.1.11.c.i)

Chassis

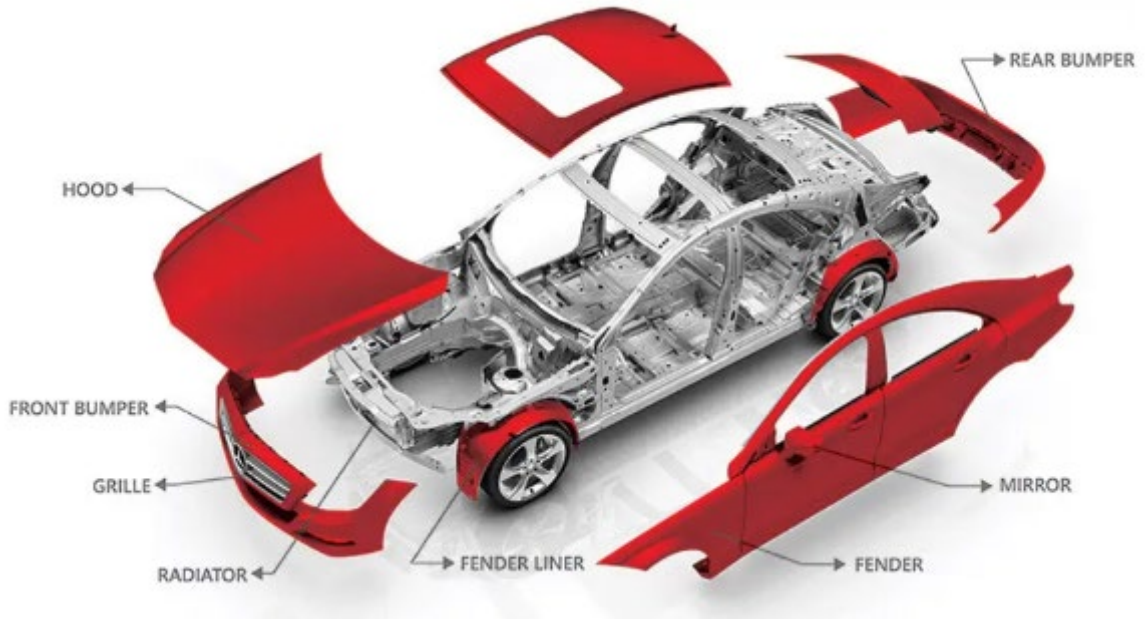
The overall structure of the car around which are assembled the mechanical components and the bodywork including any structural part of the said structure.

Bodywork

Bodywork is all the entirely suspended parts of the car licked by the airstream.

FRP

Fibre Reinforced Plastic. Composite material made of a polymer matrix reinforced by fibres.



Chassis Type - Clarification

	Chassis(*) Material	Manufacturing / Technology
Type 1	Metallic	Stamped Sheet Material
Type 2	Metallic	Space frame and/or metal-skinned sandwich structured composite (wholly or partially) that may contain elements of Type 1 structure
Type 3	FRP, wholly or partially (**)	

(*) the structure of the car except for the bodywork, the whole structure of openable doors, bonnet and the fuel tank housing that has no other mechanical function.

Chassis Type

PF web site - 2021

...

Type 3: Non-metallic composite material chassis. Composite materials may provide part of or the complete structure.

2022

Art.4.5.1a - 2022

...

(**)Type3: Fibre reinforced polymer (FRP) material chassis. FRP material may provide the complete structure or only part of the structure, in combination with other elements. With exception of openable doors.

Any FRP part with the following characteristics:

- a maximum thickness of 2 mm,
- connected only to the metal structure of the central stiffening volume,
- a volume when enclosed in a rectangular box, whose dimensions are expressed in mm such that: the sum of the Length + Width + Height is less than 1000 will be considered as decorative and not affect the chassis type definition.

Parts with dimensions greater than this or connected to other FRP panels will automatically put the chassis into chassis type 3. No assumption is made about the structural effectiveness of the part.

Chassis Type

Art.4.5.1b NEW 2022

FRP bodywork material check (Yes or No)

Check Yes, if chassis type 1 or 2 AND if the bodywork is within the wheelbase and above the plane passing through the front and the rear wheel centres, and consists wholly or partially of FRP materials.

FRP Panels whose dimensions are less than 300 x 300 mm and connected only to the metal bodywork panels will be considered as decorative and not affect this definition.

Chassis Type

Art.4.5.4 NEW 2022

Windscreen (Glass or Plastic)

Is the material of the windscreen.

Eligibility according to Appendix 7 of the Sporting Regulations.

It was present in 2021 but didn't affect the formula.

For 2022 it is included in the Pf formula calculation.

- ✓ TOLERANCES
- ✓ ENGINE PF
- ✓ AERO PF
- ✓ **CHASSIS PF:**
- ✓ Chassis Type
- ✓ Bodywork material
- ✓ **Windscreen material**

4. FIA SCRUTINEERING EQUIPMENT

Scrutineering equipment

One of the principle of the Performance Factor, is that every declared parameter can be checked within the hill climb event, with limited checking equipment.

- no electronics restrictions
- only external measurement/inspections without long dismantling (except the engine displacement and compression ratio in some cases)

Scrutineering equipment

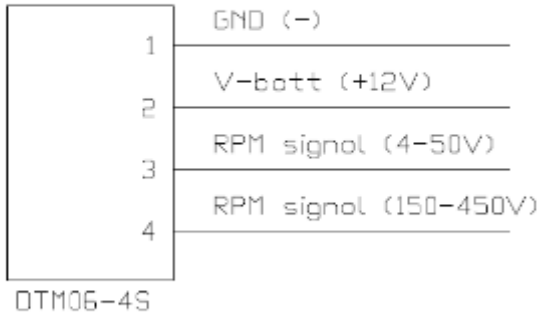
Minimum scrutineering equipment:

- ✓ Car weighing system
- ✓ Measuring tools (internal, external diameters, length, etc…)
- ✓ Plumb bob & square
- ✓ Engine speed recording system
- ✓ Compression ratio measuring equipment

Engine Speed Checking

Le Concurrent doit fournir le câblage comme décrit ci-dessous. Le faisceau doit déboucher dans l'habitacle, être facilement accessible et être doté du connecteur d'extrémité ci-dessous.

- **DEUTSCH DTM06-4S**

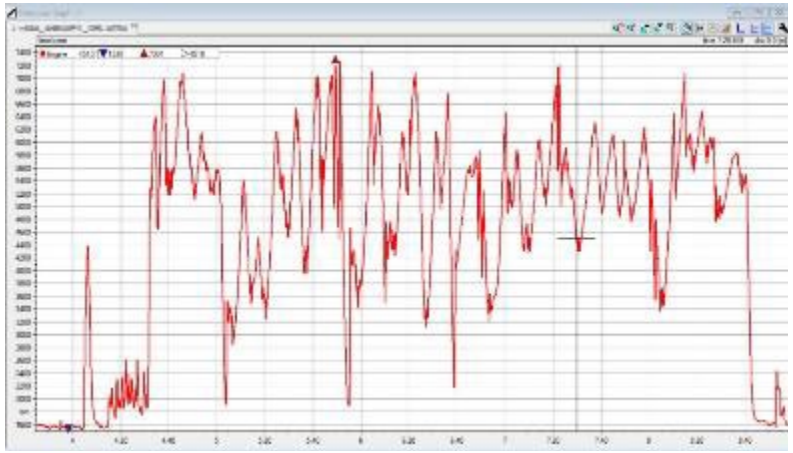


The Competitor must provide wiring as described below. The loom must terminate in the cockpit, be easily accessible and have the following end connector.

- **DEUTSCH DTM06-4S**

CAR: DTM06-4S

LOGGER: DTM04-4P



Harmonisation of email addresses dedicated to the secretariats dealing with Pf

FIA secretariat → **pf@fia.com**

YOUR ASN secretariat → **pf@ + ASN email address**

For ASNs applying the Pf (National Championships)

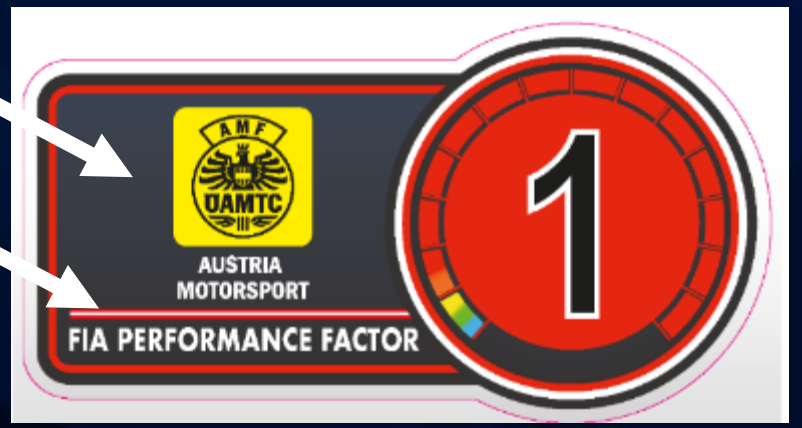
The FIA can provide you with the Pf visuals (to create your own Pf stickers to affix on the cars)

Templates provided by FIA

Your ASN logo

National flag colours

Your ASN



5. QUESTIONS FROM ASNs

Performance Factor Calculation Assumptions

Many of the Website Inputs are markers for multiple inputs. Theses assumptions guide how the calculation model is constructed and do not operate as the basic input item may be expected as an engineer.

An example is:
Assumptions made about the Wheel Diameter and Wheel Attachment inputs act as marker for *potential* high performance suspension modification

No judgement is made on the effect an input has on a individual competitor's car.

PLEASE REMEMBER
Performance Factor is a CLASSIFICATION SYSTEM not an Engineering Tool

Chassis Reinforcement

The Chassis Reinforcement Structure input is influenced by the complexity of a roll cage installed in a competitors car.

If the roll cage is legal then the competitor can choose which ever roll cage they desire. This in turn will influence the Pf number calculated.

The competitor is building the car and submitting the Pf-ID at an event.

- **They are responsible to ensure their car is built to a level of safety that they are comfortable with.**
- **Officials responsibility is to ensure that they comply to the minimum safety level specified in the regulations.**

PLEASE REMEMBER

Performance Factor is a CLASSIFICATION SYSTEM not an Engineering Tool

Chassis

The Number Of Operable Doors input assumes that a sealed door by what ever means is now part of the chassis structure of the competitors car.

The competitors car will be eligible in EHC Category 1 if the windscreen is correct as described in the 2.2.3 of Appendix 7.

PLEASE REMEMBER

Performance Factor is a CLASSIFICATION SYSTEM not an Engineering Tool

Engines

The Pf calculations will account for the influence of different inputs provided by competitors but these may have diminishing influence on the calculation in different situations

Examples are:

- **Throttle Body diameter**
- **VVT sensitivity**
- **Different Methods of Forced Induction**

PLEASE REMEMBER

Performance Factor is a CLASSIFICATION SYSTEM not an Engineering Tool

Engines

- **Ethanol Fuel to use the ‘Petrol’ input in the website**

- **Dry Sump definition: the pumps and/or the oil reservoir are external to the engine block**

- **2 stroke engines have not been accommodated as an input in the website.**

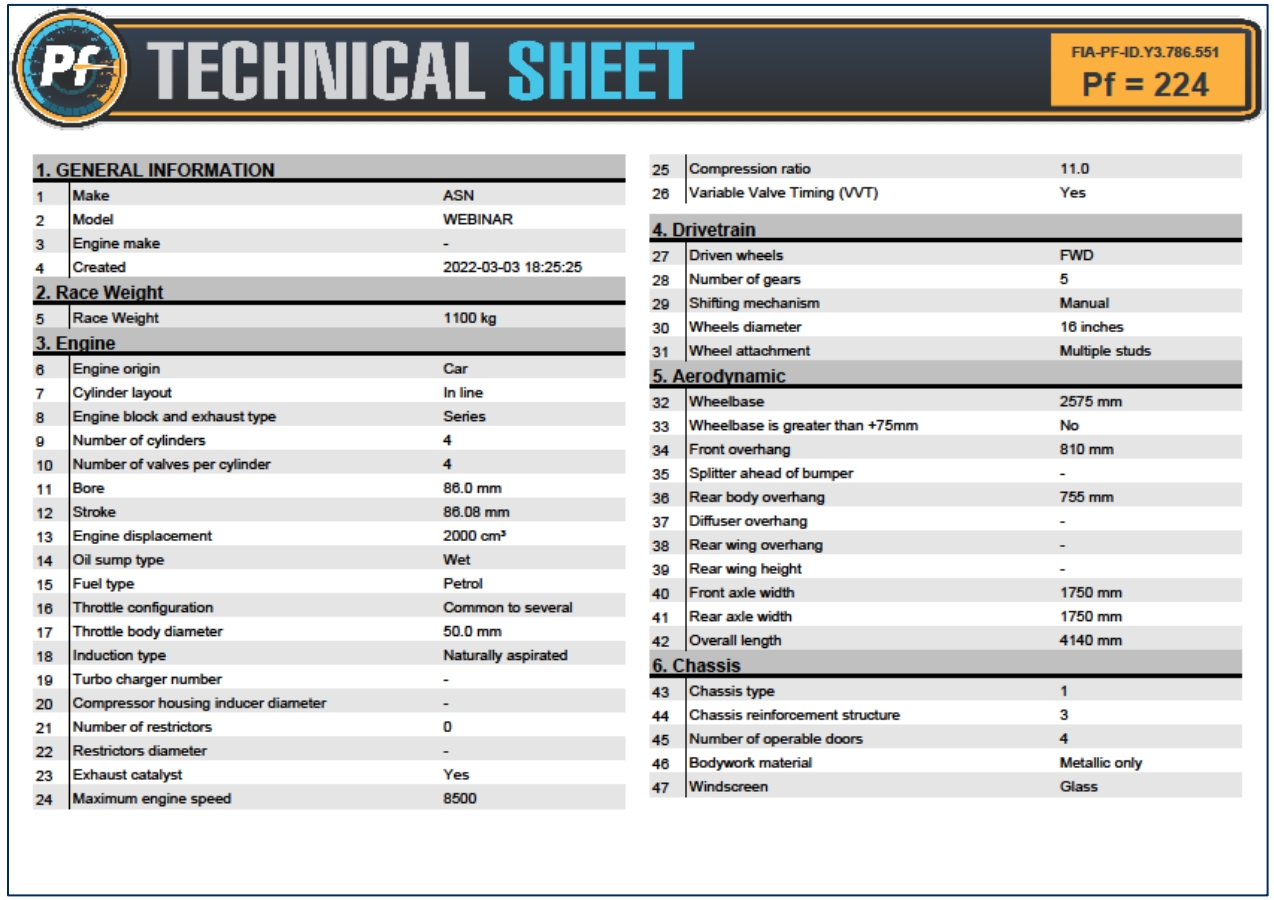
PLEASE REMEMBER
Performance Factor is a CLASSIFICATION SYSTEM not an Engineering Tool

Drivetrain

- **An example of mixed Wheel Attachment input is treated as *Centre Mount Hub***

- **Assumptions of the Shifting Mechanism take no account of the efficiency of the gearbox or gears only the type (speed) of shifting.**

Website



TECHNICAL SHEET

FIA-PF-ID.Y3.786.551
Pf = 224

1. GENERAL INFORMATION		
1	Make	ASN
2	Model	WEBINAR
3	Engine make	-
4	Created	2022-03-03 18:25:25
2. Race Weight		
5	Race Weight	1100 kg
3. Engine		
6	Engine origin	Car
7	Cylinder layout	In line
8	Engine block and exhaust type	Series
9	Number of cylinders	4
10	Number of valves per cylinder	4
11	Bore	86.0 mm
12	Stroke	86.08 mm
13	Engine displacement	2000 cm³
14	Oil sump type	Wet
15	Fuel type	Petrol
16	Throttle configuration	Common to several
17	Throttle body diameter	50.0 mm
18	Induction type	Naturally aspirated
19	Turbo charger number	-
20	Compressor housing inducer diameter	-
21	Number of restrictors	0
22	Restrictors diameter	-
23	Exhaust catalyst	Yes
24	Maximum engine speed	8500
25	Compression ratio	11.0
26	Variable Valve Timing (VVT)	Yes
4. Drivetrain		
27	Driven wheels	FWD
28	Number of gears	5
29	Shifting mechanism	Manual
30	Wheels diameter	16 inches
31	Wheel attachment	Multiple studs
5. Aerodynamic		
32	Wheelbase	2575 mm
33	Wheelbase is greater than +75mm	No
34	Front overhang	810 mm
35	Splitter ahead of bumper	-
36	Rear body overhang	755 mm
37	Diffuser overhang	-
38	Rear wing overhang	-
39	Rear wing height	-
40	Front axle width	1750 mm
41	Rear axle width	1750 mm
42	Overall length	4140 mm
6. Chassis		
43	Chassis type	1
44	Chassis reinforcement structure	3
45	Number of operable doors	4
46	Bodywork material	Metallic only
47	Windscreen	Glass

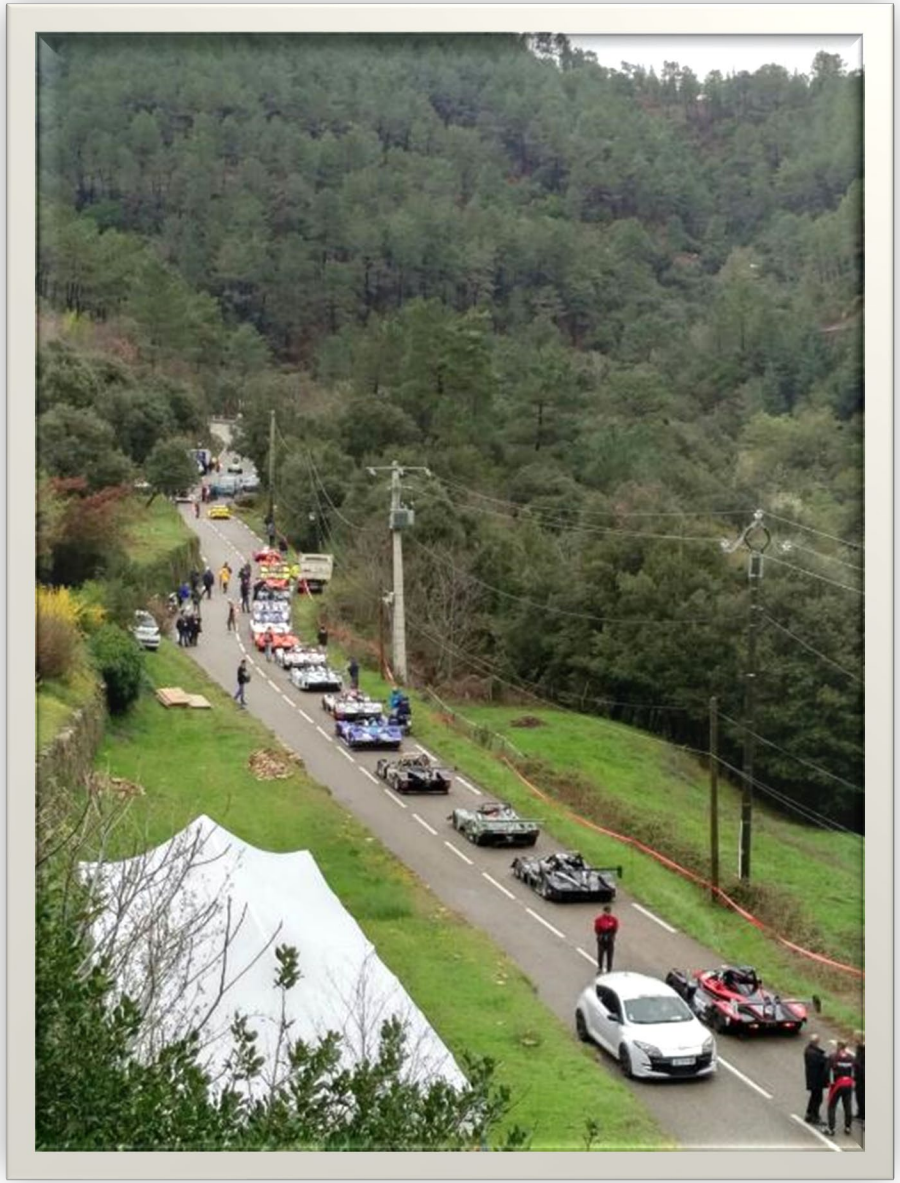
- **Addition of the Group Number in the Technical Sheet output will be investigated.**

- **Translation into the multiple languages onto the Website is taking time to complete correctly.**

- **Tolerances published in Appendix 6 will take precedence.**

It will be investigated if we can embed a link in the website to the tolerances in the current Appendix 6.

General



- **Changing Pf Between events**

  This is completely free. No restrictions on the number inputs that can be changed by a competitor between events.

- **Adoption of Pf by ASN's**

  This is up to the individual ASN to decide.

- **Creation of Different Classes**

  The individual ASN can increase the number classes in a Group or do other changes to suit the national circumstances.

- **Protesting Pf**

  In the opinion of the authors this is possible, but untested. This is a sporting issue and outside our technical remit.

6. WEBINAR - Q&A

We remain at your disposal should you have any questions:

@ pf@fia.com

March 2022

THE TEXTS IN THIS PRESENTATION ARE FOR INFORMATION ONLY.

THE ONLY REGULATIONS THAT ARE CONSIDERED OFFICIAL ARE THOSE PUBLISHED IN THE FIA YEARBOOK OF AUTOMOBILE SPORT, IN THE PERIODICAL FIA BULLETINS AND ON THE FIA WEBSITE (WWW.FIA.COM).

CONCLUSION

Performance Factor is a Classification System

NOT an Engineering Tool

Le Facteur de Performance est un système de classification
PAS un outil d'ingénierie

Il Fattore di Performance è un sistema di classificazione
NON uno strumento di ingegneria

THANK YOU!

March 2022

PF WEBINAR

03.03.2022

A WORLD IN MOTION

FEDERATION
INTERNATIONALE
DE L'AUTOMOBILE

FIA.COM