HILL CLIMB

PERFORMANCE FACTOR (Pf)
CONCEPT OF CAR CLASSIFICATION

EXPLANATION AND REQUIREMENTS FOR 2019 EVENTS

A WORLD IN MOTION

28-02-2019 (issue 2)

HILL CLIMB

OPEN
TECHNICAL
REGULATIONS

NEW
PERFORMANCE
FACTOR
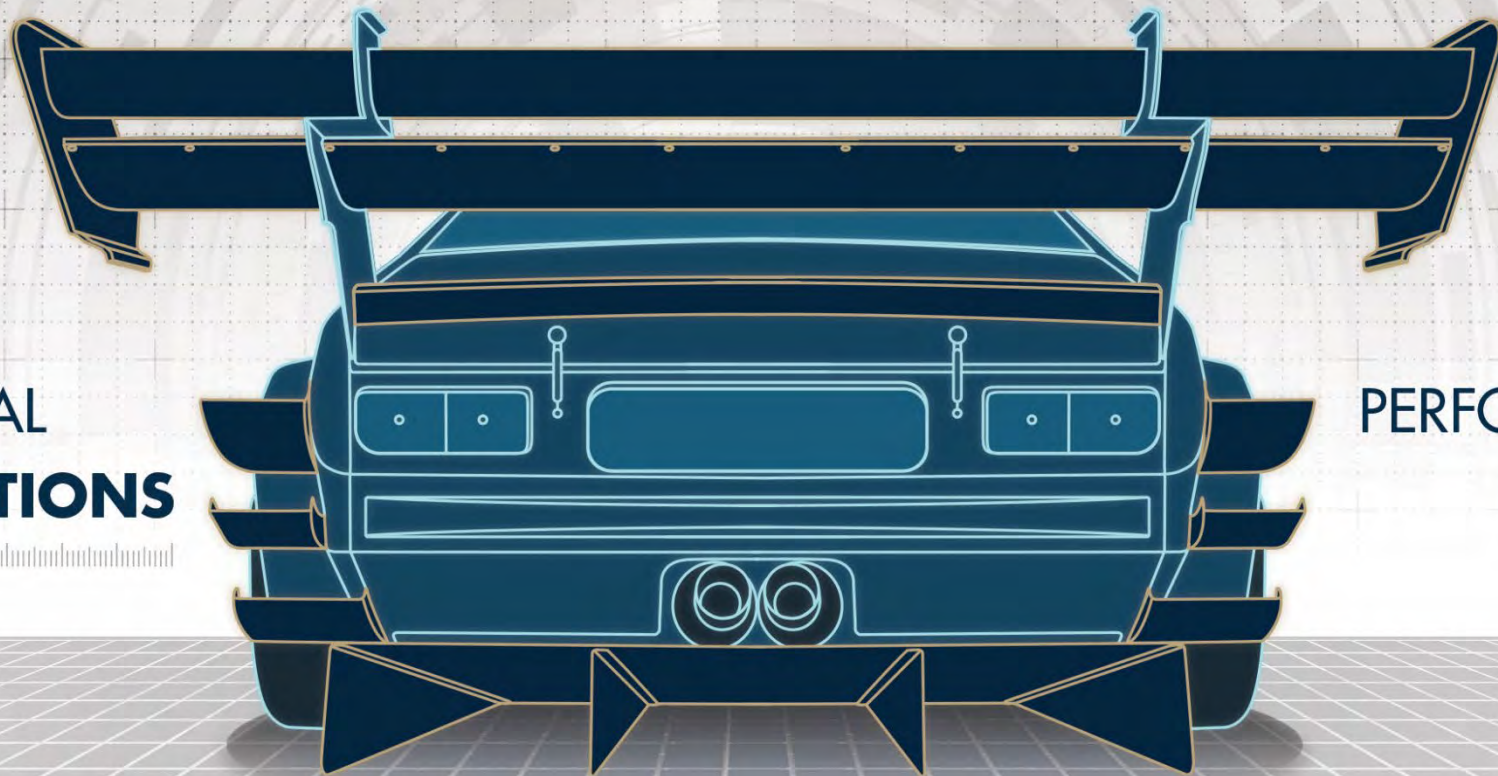
LOOKING *TO THE FUTURE*

FiA

CONTENTS

A WORLD IN MOTION

INTRODUCTION

The Performance Factor (**Pf**) concept is designed to classify a diverse range of 'production based' cars for all hill climb competitions. The objective is to simply combine the technical features of a car to determine the class it will compete in. This process will be independent of the car's previous homologations, one-make series build specification or previous competition history.

This will allow cars, previously unable to be used in FIA Hill Climbs, to return to active competition and allow a larger variety of new cars to be proposed for entry.

Using physical data input by the competitor describing their car, calculations are made to derive a **Pf** number that places the car in the appropriate class.

The **Pf** will ensure that:

- The *competitor* is clear which class the car is allowed to compete in.

- The *organiser* can easily put the car in the appropriate class for an event.

- The *scrutineers* have physical elements available at an event to check against the classification.

- The *stewards* can resolve technical protests at an event without reference to paperwork from other championships/homologations, etc.

The objective in 2019 is to test the **Pf** systems, ahead of the 2020 season implementation.

A WORLD IN MOTION

PERFORMANCE FACTOR (Pf)

The **Pf** is derived from physical data input by the competitor to describe the car being entered. This involves using the data for calculations and checks against qualifying 'exceptions' that limit the class a car may compete in.

a) To calculate the **Pf,** the FIA **Pf** website is used as shown in *Table 1*.

Table 1

FIA Pf Website Features	
FIA Pf Website Operation	Comments will be solicited from competitors, officials and organisers about the operation and features of the website.
Input Car Data	Competitor enters data for his/her car.
Calculation	FIA **Pf** Website uses input data to calculate a Pf number.

PERFORMANCE FACTOR (Pf)

b) Calculation

The **Pf** calculation is as follows and is detailed in *Appendix 2:*

$$Pf = \frac{\textbf{Race Weight}}{(\textbf{Engine } Component * \textbf{Drive Train } Component * \textbf{Aero } Component * \textbf{Chassis } Component)}$$

Each component is calculated using physical data supplied by the competitors about their car.
The resulting number (**Pf**) is used to place the car in a class.

c) The minimum weight of a car cannot be less than the weight decided by the FIA Hill Climb Commission (normally as described in Article 277.3 of Appendix J for Category I). *Awaiting for new technical regulations (for application from 2020).*
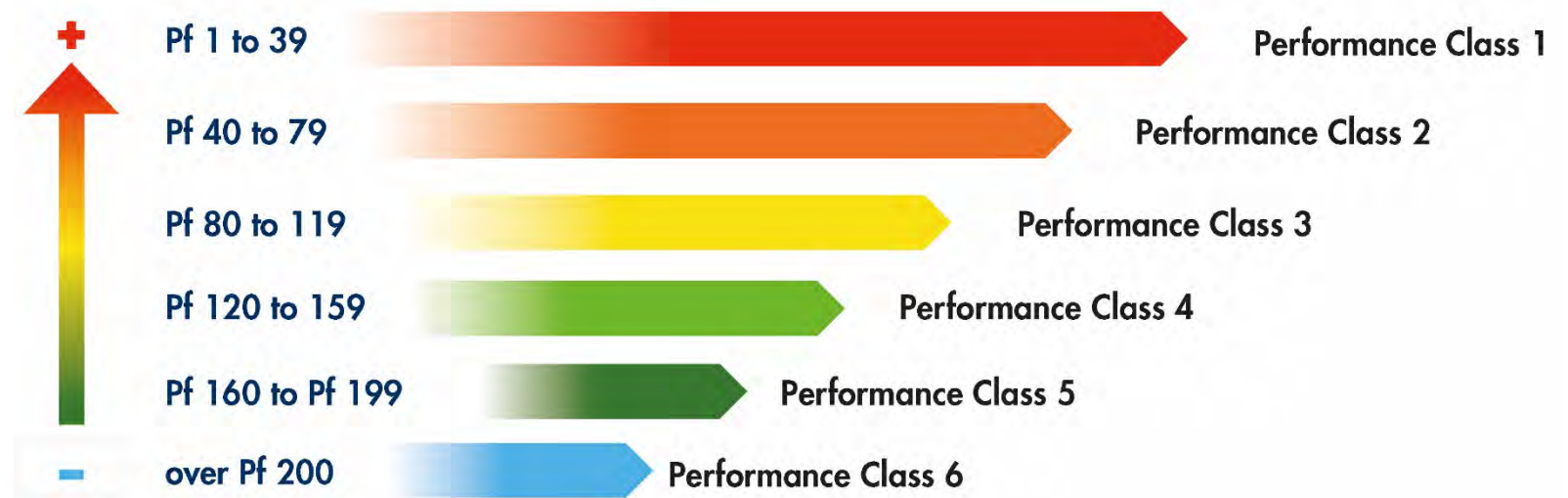
d) Pf Classification of cars

A car's **Pf** will determine the class it is in.

For example, Class 1 contains the higher performance cars with a **Pf** number in the range of 0-50. Higher numbered classes will contain lesser performing cars. The number of classes will be determined according to the Pf number 'window' to be decided.

PERFORMANCE FACTOR (Pf)

Pf classification (example)*

+	Pf 1 to 39	Performance Class 1
	Pf 40 to 79	Performance Class 2
	Pf 80 to 119	Performance Class 3
	Pf 120 to 159	Performance Class 4
	Pf 160 to Pf 199	Performance Class 5
–	over Pf 200	Performance Class 6

values, terminologies and classifications published only by way of general guidance

e) Pf Website Access

The FIA **Pf** website will be accessible to: all parties, including the general public/press. They will be able to use this website to see how different combinations of technical specifications change the car's performance. Similar to preparing a car in a motor sport video game.

PERFORMANCE FACTOR

RACE WEIGHT

ENGINE

DRIVE TRAIN

AERODYNAMIC

CHASSIS

HILL CLIMB

Pf 37

PROJECT TIMING

During 2019

The **Pf** is to be trialled the FIA Championship events listed in Table 2. **Pf** simulations will be conducted by FIA technical observers.

Drivers and Competitors

Drivers and Competitors from Category 1 (Groups A, N, S20 and GT) and Group E2-SH in Category 2 will have to complete the **Pf information on the entry form** (from the **Pf** technical declaration) before the FIA Competition or, on request, during scrutineering.

The procedures related to this **Pf** technical declaration (online registration etc.) will be specified in a bulletin.

These trials will be used to help educate and inform organisers, competitors, officials and stewards on the **Pf** concept and gather data on potential challenges at specific events.

This will require a larger team to deal with the technical and media requirements.

Table 2

Event		Date	Nr of FIA Personnel Attending
St Jean du Gard	FRA	12-14/04	2-3
Rechberg	AUT	26-28/04	2-3
Rampa Int. da Falperra	PRT	10-12/05	1-2
Subida Int. al Fito	ESP	17-19/05	1-2
Ecce Homo Sternberk	CZE	31/05-02/06	1-2
ADAC Glasbachrennen	DEU	14-16/06	1-2
Trento Bondone	ITA	05-07/07	1-2
Dobsinsky kopec	SVK	19-21/07	1-2
Limanowa	POL	26-28/07	2-3
St. Ursanne	CHE	16-18/08	1-2
GHD Petrol Ilirska Bistrica	SVN	30/08-01/09	1-2
Buzetski dani	HRV	13-15/09	1-2

PROJECT TIMING

In 2020

The aim is to implement the **Pf** system in Category 1 (Groups A, N, S20 and GT) and in Category 2 (Group E2-SH) for the full FIA Championship and Cup.

In 2021

The aim is to implement the **Pf** system in Category 2 (Groups E2-SS, E2-SC and CN) for the full FIA Championship and Cup.

FIA Pf WEBSITE

Multiple levels of access will be required to cater for the different user groups.

The FIA **Pf** website must be useable for these users as described below in Data Output.

The results of testing the system in 2018 & 2019 will help the FIA to understand how to implement the concept in 2020.

Data Output			
USER GROUP	USE OF PERFORMANCE FACTOR (PF) DATA OUTPUT	ACCESS ALLOWED BY USER GROUP	
		PF NUMBER	INPUT DATA
COMPETITORS	The **Pf** of the competitor's own car and the class the car qualifies for	**YES** *for the competitor's car only*	**YES** and can alter the data for the competitor's car only
SCRUTINEERS	Use data to check the car at an event	**YES** for all cars	**YES** visual access only for all cars *[A unique scrutineer comment sheet will be used for their input]*
ORGANISERS	**Pf** used to arrange cars into appropriate classes	**YES** for all cars	**NO**
TIMEKEEPERS	Results use classes determined by **Pf**	**YES** for all cars	**NO**
STEWARDS	Access to appropriate car data if relevant to a protest	**YES** for all cars	**YES** visual access only for all cars

FIA Pf WEBSITE

a) The FIA **Pf** website is an ideal addition to the concept because it will provide a platform to input, manipulate and provide information to all groups requiring access to the information.

b) The competitor will have an access point to the FIA **Pf** website where they will fill out an electronic 'Declaration Form' by entering data describing their car and declaring it is correct. Once they have entered this data, subsequent events will require minimal input. If there is a modification to the car during the season they can input the change into the FIA **Pf** website and the new Pf will be logged.

c) Organisers can access the same FIA **Pf** website to check the cars entered into their event. The classification of these cars will be done automatically using the data the competitor entered and declared accurate, thus saving the organiser time before the event.

Organisers can run national classes within the FIA competitions that can be 'isolated ' for local prizes using the FIA **Pf** website if requested.

d) Stewards can handle protests or scrutineers' reports quickly with the requirement for only physical checks. The results can therefore be verified and released more easily.

A WORLD IN MOTION

REQUIREMENTS FOR EACH FIA CHAMPIONSHIP EVENT

The following will be required from the organiser to support the FIA personnel attending each event described in *Table 2*.

General Requirements during the event

➢ A dedicated work room or area with mobile phone signal and power supply (1-4 people).
➢ Internet Wifi access.
➢ A dedicated translator.
➢ An information session (20mn) led by the FIA technical observer and scheduled following the Drivers' Briefing (screen, beamer, microphone, Wifi access).

Before scrutineering

- Internet Wifi access in the weighing area.
- Weight scales for the competitors to check race weights (free access within a specified time frame).
- An area to present the **Pf** to organisers / officials / competitors.

During scrutineering

- Internet Wifi access in the scrutineering area.
- Weight scales to check race weights.

During competitions

- An internet Wifi access in the scrutineering area (essential) and in parc fermé (if possible).
- Weight scales to check race weights with a minimum of 4 people to operate the four balance pads.
- A screen to display the live timing in the format specified by FIA.
- A dedicated timekeeper in charge of issuing the **Pf** results and documents according to FIA format.

A WORLD IN MOTION

COMPETITORS

a) Before the FIA Championship competitions (or, on request, during scrutineering), drivers and competitors from Category 1 (Groups A, N, S20 and GT) and Group E2-SH in Category 2 will have to fill in the **Pf** form on the FIA **Pf** website.

During these FIA Championship events, the FIA personnel will engage local competitors to help them fill out the 'Declaration Form' and introduce them to the **Pf** concept. By doing this, the FIA personnel can gather the following information and help disseminate information about **Pf** to the end users.

- Entrant information;
- Car information;
- Driver equipment information.

b) Access to multi-lingual information will be important and this is why a dedicated translator will be required.

c) It is also hoped that the FIA **Pf** website will be accessible during the event to demonstrate to the competitors how potential car changes affect the **Pf** classification.

A WORLD IN MOTION

SCRUTINEERS

a) During the event, the scrutineers will be shown how the **Pf** classification will be used and how the FIA **Pf** website could facilitate and enhance their checking ability. They will be able to check the following to aid their technical checks:

- Check car data to confirm correct classification;
- See reports on the car from preceding events.

b) Scrutineers can input notes into a car's data file relating to the specific event. FIA personnel will demonstrate this data access and input procedure.

A WORLD IN MOTION

COMPARISON / ELIGIBLE CARS

THE FOLLOWING PAGES ILLUSTRATE A SAMPLE OF POTENTIAL HILL CLIMB CARS AND COMPARE THEIR 2019 ELIGIBILITY WITH THEIR POTENTIAL 2020 ELIGIBILITY.

Organisers can get a larger variety of entries into the FIA Competition with the use of the **Pf**. Examples are in the table below.

Car	2019	2020	Pf Specifications		
Mitsubishi Lancer Evo IX	Eligible / Category I / Group N	Eligible / Category I	2 l. Turbo	4WD	1400kg
Honda Civic	Eligible / Category I / Group N	Eligible / Category I	2.0 l. N/A	FWD	1200kg
Citroën DS3 R1	Eligible / Category I / Group A (R3T)	Eligible / Category I	1.6 l. N/A	FWD	1095kg
Honda Integra Type R	Eligible / Category I / Group A	Eligible / Category I	1.8 l. N/A	FWD	1250kg
Audi Sport Quattro	Not eligible / Group E1	Eligible / Category I	2.2 l. Turbo	4WD	1250kg
Lancia Delta Integrale EVO	Not eligible / Group E1	Eligible / Category I	2.0 l. Turbo	4WD	1200kg
Mitsubishi Lancer Evo VIII	Not eligible / Out of Group A homologation	Eligible / Category I	2 l. Turbo	4WD	1325kg
Opel Kadett C V8 GT/R	Eligible in Category II / Group E2-SH	Eligible / Category I	5.7 l. N/A	RWD	1250kg

Car	2019	2020	Pf Specifications		
Mitsubishi Lancer Evo IX	Eligible in Category II / Group E2-SH	Eligible / Category I	2.0 l. Turbo	4WD	1380kg
Seat Léon Super Coppa	Not eligible / Group FFSA/A	Eligible / Category I	1.9 l. Turbo	FWD	1120kg
Peugeot 106 XSi	Not eligible / Group FFSA/FN	Eligible / Category I	1.4 l. N/A	FWD	925kg
BMW M3 E46 GTR	Not eligible / Group FFSA/GTTS	Eligible / Category I	3.2 l. Turbo	RWD	1200kg
BMW 320 WTCC	Not eligible / Group E1	Eligible / Category I	2 l. N/A	RWD	1180kg
Subaru Impreza WRX STI	Not eligible / Group E1	Eligible / Category I	2 l. Turbo	4WD	1300kg
Audi 80 Quattro	Not eligible / Group E1	Eligible / Category I	1.7 l. Turbo	4WD	1070kg
Honda Civic	Not eligible / Group E1	Eligible / Category I	1.6 l. N/A	FWD	1120kg
Peugeot 106 GTi	Not eligible / Group E1	Eligible / Category I	1.6 l. N/A	FWD	950kg
VW Scirocco	Not eligible / Group E1	Eligible / Category I	2.0 l. N/A	FWD	830kg

Car	2019	2020	Pf Specifications		
Opel Kadett	NOT ELIGIBLE → Group E1	ELIGIBLE Category I	2.3 l. N/A	RWD	980kg
Volvo TC10	NOT ELIGIBLE → Group FFSA/GTTS	ELIGIBLE Category I	N/A	RWD	1150kg
Renault Williams BTCC	NOT ELIGIBLE → BTCC	ELIGIBLE Category I	2.0 l. N/A	FWD	960kg
Suzuki Swift Sport 1.6	NOT ELIGIBLE → Swift Cup	ELIGIBLE Category I	1.6 l. N/A	FWD	1130kg
Mitsubishi Mirage R5 WRT Evo2	NOT ELIGIBLE → Group E1	ELIGIBLE Category I	2.0 l. Turbo	4WD	1270kg
BMW Mini JCW	NOT ELIGIBLE → Group E1 (Italian Starter Class – Racing start)	ELIGIBLE Category I	1.6 l. Turbo	FWD	1130kg
Vauxhall Nova-Suzuki	NOT ELIGIBLE → Group National ("class 1A - Bantam Saloon Class" / Irish Hill Climb Championship)	ELIGIBLE Category I	1.3 l. N/A	FWD	800kg

* N/A   Naturally Aspirated Induction

A WORLD IN MOTION

APPENDIX 1

PERFORMANCE FACTOR
INPUT DATA FOR THE FIA *Pf* WEBSITE

1. GENERAL INFORMATION

Input #		
1	Entrant name	
2	Driver name	
3	Contact email	
4	Car - make	
5	Car - model	
6	Engine – make	

2. RACE WEIGHT

Input #		
7	Race weight	kg
	(weight of the car, driver and fluids incl.)	

3. ENGINE

Input #		
8	Origin	☐ Car ☐ Moto
9	Cylinder layout	☐ L ☐ V ☐ W ☐ H
10	No. of cylinders	
11	No. of valves (total in the engine)	
12	Bore	mm
13	Stroke	
14	Displacement	cm^3
15	Oil Sump type	☐ Dry ☐ Wet
16	Fuel type	☐ Petrol ☐ Diesel
17	Induction type	☐ Turbo / Supercharger ☐ Normally aspirated
18	No. of restrictors	
19	Restrictor inside diameter	mm

4. DRIVETRAIN

Input #		
20	Driven wheels position	☐ FWD ☐ RWD ☐ AWD
21	No. of gears	
22	Shifting mechanism	☐ Manual ☐ Sequential
23	Wheel diameter	Inches

5. AERODYNAMIC

Input #		
24	Wheelbase	mm
25	Front overhang (max)	mm
26	Splitter ahead of bumper	mm
27	Rear overhang (max)	mm
28	Diffuser rearward of rear bumper	mm
29	Rear wing position rearward of rear wheel centreline	mm
30	Rear wing height above ground level	mm
31	Front width of car on front axle centreline	mm
32	Rear width of car on rear axle centreline	mm

6. CHASSIS

Input #		
33	Roll cage type (see Appendix 4)	☐ 1 ☐ 2 ☐ 3
34	Chassis structure type (see Appendix 4)	☐ 1 ☐ 2 ☐ 3 ☐ 4
35	No. of operable doors and rear hatch (if applicable)	☐ 2 ☐ 3 ☐ 4 ☐ 5
36	Fuel tank type	☐ Production ☐ FIA
37	Windscreen	☐ Glass ☐ Plastic

➡️ **Pf**

APPENDIX 2

PERFORMANCE FACTOR CALCULATIONS

The class the car will run in will be determined by the Performance Factor (**Pf**) calculated using the data provided by each competitor in the 'Declaration Form' on the FIA **Pf** website.

$$\textbf{Pf} = \frac{Rw}{PcE * PcD * PcA * PcC}$$

Where

Rw = Racing weight (including Driver)

PcE = Engine Performance Component

PcD = Drive Train Performance Component

PcA = Aerodynamic Performance Component

PcC = Chassis Performance Component

A WORLD IN MOTION

The class the car will run in will be determined by the Performance Factor (**Pf**) calculated using the data provided by the competitor in the 'Declaration Form' on the FIA **Pf** website.

RACING WEIGHT	(Rw)
Weight of car and driver [Kg]	As measured in parc fermé

▶ *Appendix 1 Input Number 7*

2. RACE WEIGHT

Input #		
7	Race weight	kg
	(weight of the car, driver and fluids incl.)	

ENGINE	(PcE)
Engine = FIA Power calculation using data from engine component in Appendix 1 Input Numbers 8-19	

▶ *Appendix 1 Input Numbers 8-19*

3. ENGINE

Input #		
8	Origin	☐ Car ☐ Moto
9	Cylinder layout	☐ L ☐ V ☐ W ☐ H
10	No. of cylinders	
11	No. of valves (total in the engine)	
12	Bore	mm
13	Stroke	
14	Displacement	cm³
15	Oil Sump type	☐ Dry ☐ Wet
16	Fuel type	☐ Petrol ☐ Diesel
17	Induction type	☐ Turbo / Supercharger ☐ Normally aspirated
18	No. of restrictors	
19	Restrictor inside diameter	mm

DRIVETRAIN	(PcD)		
	Input Values		
Number of Gears	N in 1.1^(N/4)		
Wheel Diameter (inches)	17" Standard in 76kg / inch diameter		
	Configuration question reply	**Yes**	**No**
Gearbox actuation	Manual	x 1.0	x 1.0
	Sequential (automatic)	x 1.1	x 1.0
Driven Wheels	Front wheel drive	x 1.0	x 1.0
	Rear wheel drive	x 1.1	x 1.0
	All-wheel drive	x 1.3	x 1.0

► *Appendix 1 Input Numbers 20-23*

4. DRIVETRAIN
Input #

20	Driven wheels position	☐ FWD ☐ RWD ☐ AWD
21	No. of gears	
22	Shifting mechanism	☐ Manual ☐ Sequential
23	Wheel diameter	Inches

AERODYNAMIC	(PcA)		
Input Values			
Wheelbase [mm]	WB		*See Appendix 3*
Front overhang to Splitter [mm]	SFOH	Front overhang, Front of splitter to front axle line	*See Appendix 3*
Splitter length [mm]	SL	Front of splitter to front of bumper overhang	*See Appendix 3*
Rear overhang (lower) to end of diffuser or bumper [mm]	LROH	Rear overhang Rear axle line to longest dimension, rear bumper or diffuser	*See Appendix 3*
Rear overhang to end of rear wing [mm]	RWROH	Rear overhang above top of tyre height, rear axle line to rear wing Rear dimension (if rearward of rear bumper)	*See Appendix 3*
Rear wing height [mm]	RWH	Maximum height of rear wing from ground	*See Appendix 3*
Width at front wheels [mm]	Wfw	From outside of tyre to outside of tyre at front	*See Appendix 3*
Width at rear wheels [mm]	Wrw	From outside of tyre to outside of tyre at rear	*See Appendix 3*
Calculated Values			
Splitter area [m²]	SA=	SFOH * Wfw	
Diffuser area [m²]	DA=	LROH * Wrw	
Rear wing area [m²]	RWA=	$(RWROH^2+RWH^2)^{\frac{1}{2}}$ * Wrw	
Calculation using data from aero component in Appendix 1 Input Numbers 24-32			

▶ *Appendix 1 Input Numbers 24-32*

5. AERODYNAMIC

Input #

24	Wheelbase	mm
25	Front overhang (max)	mm
26	Splitter ahead of bumper	mm
27	Rear overhang (max)	mm
28	Diffuser rearward of rear bumper	mm
29	Rear wing position rearward of rear wheel centreline	mm
30	Rear wing height above ground level	mm
31	Front width of car on front axle centreline	mm
32	Rear width of car on rear axle centreline	mm

CHASSIS	(PcC)		
Roll cage			*Factor used*
Type 1	App. J 253 Article 8.3.1 + Article 8.3.2.1 Using basic cage in Dwg 253 1-3 plus one or more of Dwg 253 4-15	*See Appendix 4*	1
Type 2	Type 1, plus one or more of Dwg 253 16-33	*See Appendix 4*	2
Type 3	Cage with extra structure not in App. J 253 Article 8.3.2	*See Appendix 4*	3
EXTRA Chassis structure			*Factor used*
CS1	No extra *structural members*		1
CS2	Structural member(s) between one or both axle strut towers without intermediate connections.	*See Appendix 4*	2
CS3	Additional structural member(s) within the central structural volume	*See Appendix 4*	3
CS4	Additional structural member(s) outside the central structural volume	*See Appendix 4*	4
Number of doors			
	Number of doors and rear hatch that access the cockpit of the car.		2 to 5

► *Appendix 1 Input Numbers 33-35*

6. CHASSIS

Input #

33	Roll cage type *(see Appendix 4)*	☐ 1 ☐ 2 ☐ 3
34	Chassis structure type *(see Appendix 4)*	☐ 1 ☐ 2 ☐ 3 ☐ 4
35	No. of operable doors and rear hatch (if applicable)	☐ 2 ☐ 3 ☐ 4 ☐ 5

Specific data will trigger exceptions to the calculated **Pf**. Certain configurations will be allowed only in defined classes.

Examples are:

- Production fuel tanks are currently not allowed in FIA international events (Appendix 1, Input Number 36).

- *To be confirmed* - The use of non-production windscreen material may be allowed in lower **Pf** number classes, i.e. higher performance levels (Appendix 1, Input Number 37).

These exceptions will trigger appropriate changes to the calculation described above.

A WORLD IN MOTION

APPENDIX 3

AERODYNAMIC COMPONENT DIMENSION DEFINITION

Aerodynamic Component Dimension Description
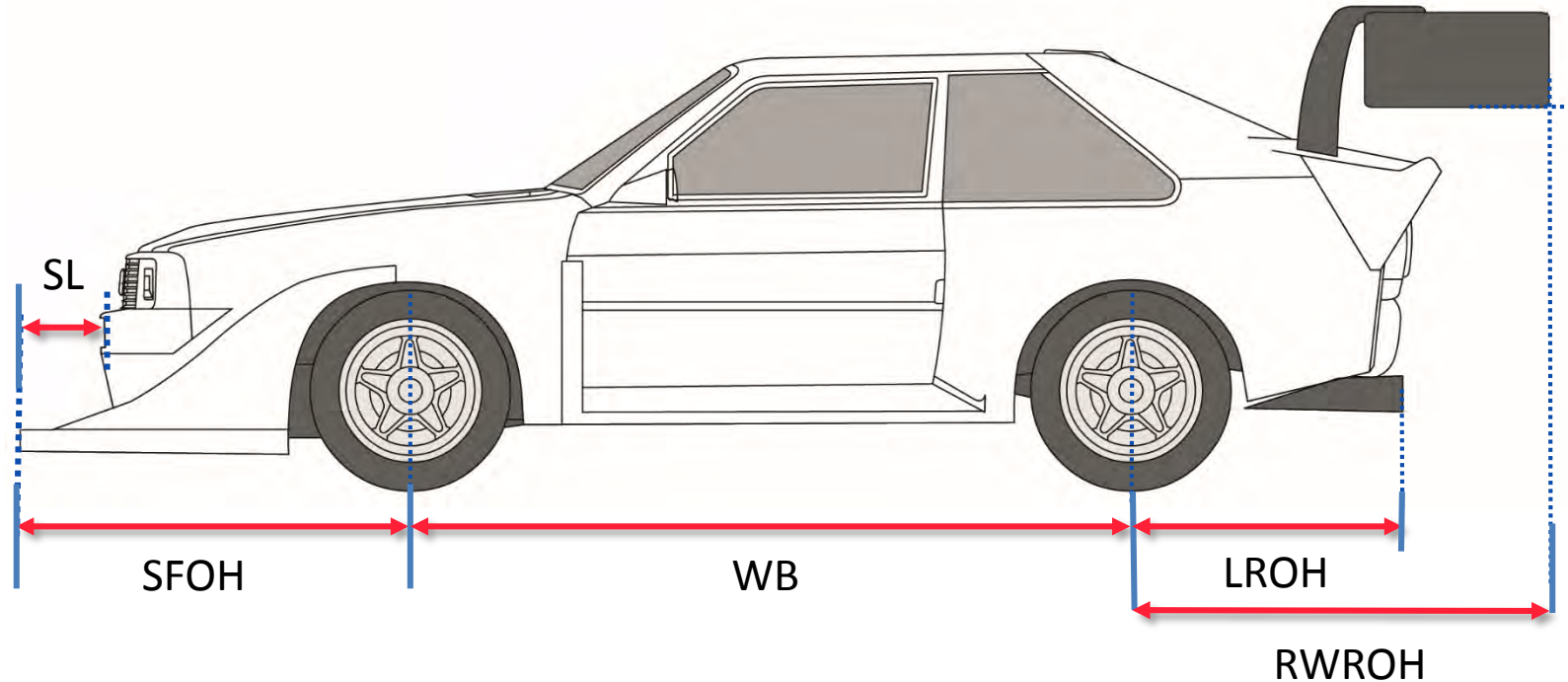
SL   ► Splitter Length [mm] / *Front of splitter to front of bumper overhang*

SFOH   ► Front Overhang to Splitter [mm] / *Front overhang, Front of splitter to front axle line*

WB   ► Wheelbase [mm]

LROH   ► Rear Overhang (lower) to end of Diffuser or Bumper [mm] / *Rear overhang, Rear axle line to longest dimension, rear bumper or diffuser*

RWROH ► Rear Overhang to end of Rear Wing [mm] / *Rear overhang above top of tyre height, rear axle line to rear wing Rear dimension (if rearward of rear bumper)*

Aerodynamic Component Dimension Description
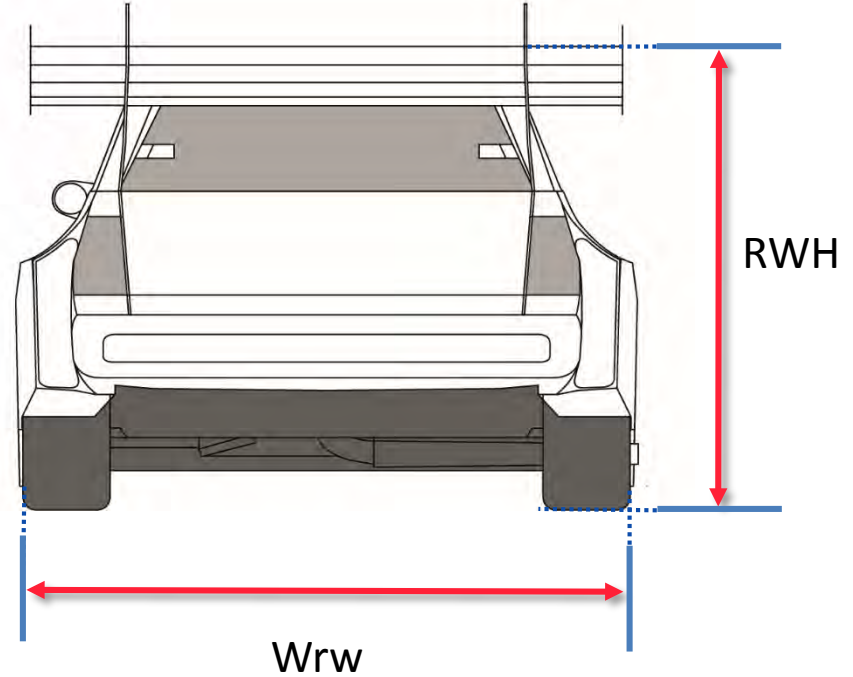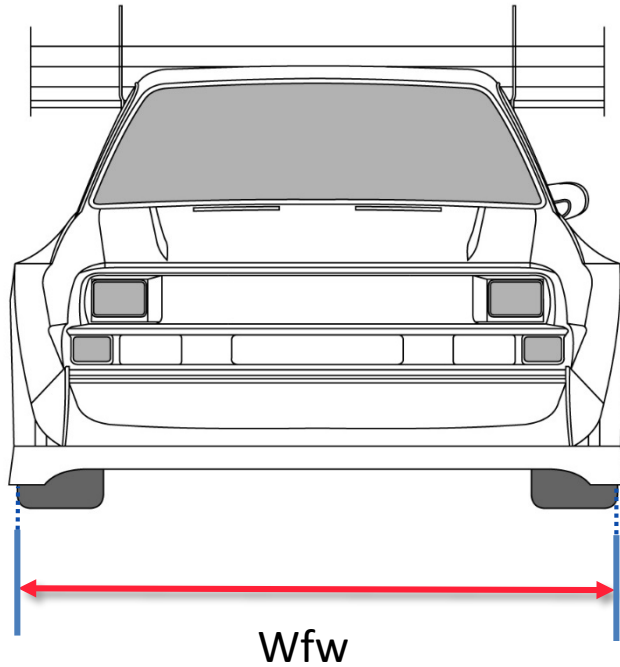
Wfw	▶ Width at Front Wheels [mm]	/ *From outside of tyre to outside of tyre at front*
Wrw	▶ Width at Rear Wheels [mm]	/ *From outside of tyre to outside of tyre at rear*
RWH	▶ Rear Wing Height [mm]	/ *Maximum height of rear wing from ground*

APPENDIX 4

CHASSIS COMPONENT CLASSIFICATION

Roll Cage Types are described below:

Type 1 Basic Roll Cage
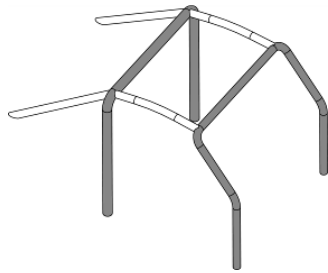
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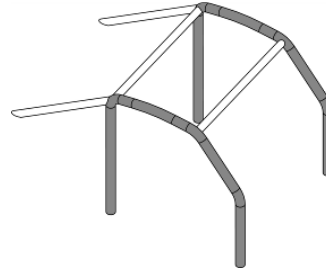
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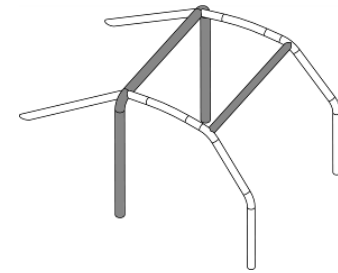
253-3

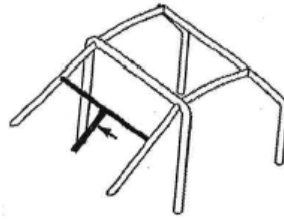## Type 1 Basic Roll Cage (additions)

253-7

253-?
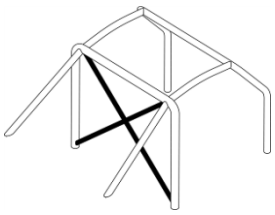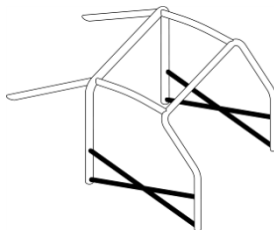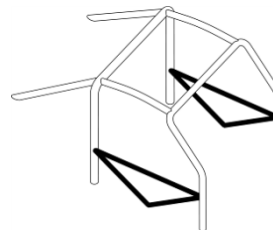
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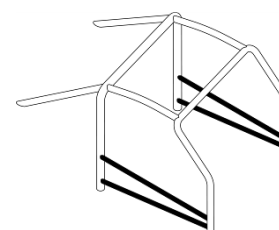
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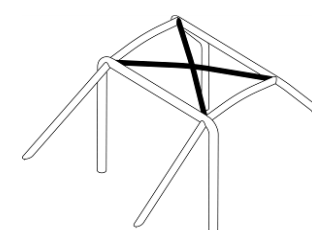
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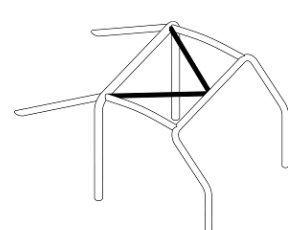
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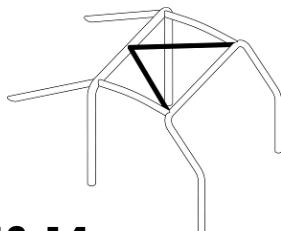
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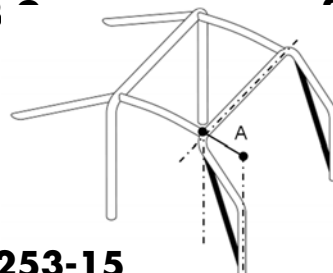
253-15

Type 2 Roll Cage (optional additions)

253-16

253-17

Cette connexion peut être au niveau de l'entretoise de portière
This connection may be at the level of the doorbar
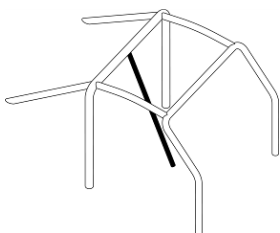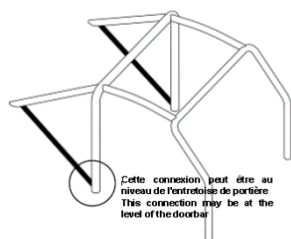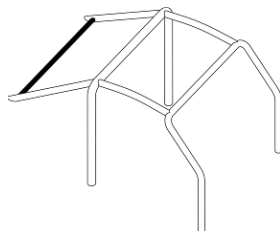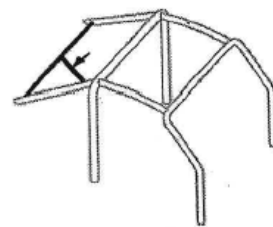
253-18

253-18B
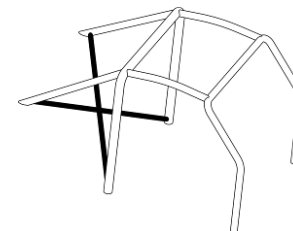
253-19
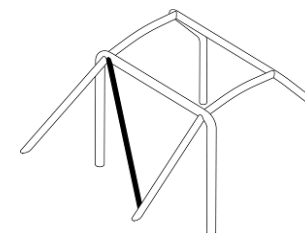
253-20
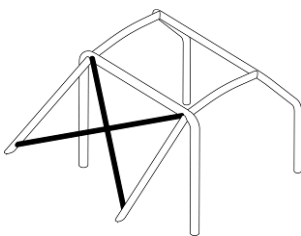
253-21
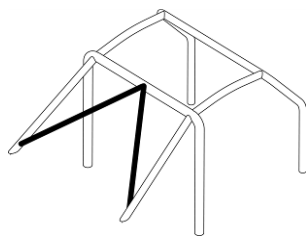
253-22
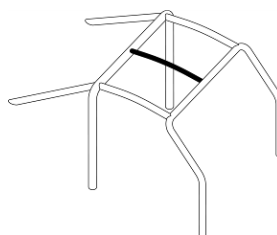
253-23
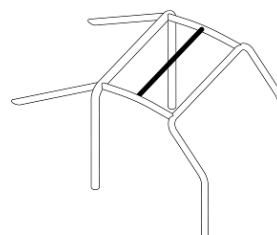
253-24
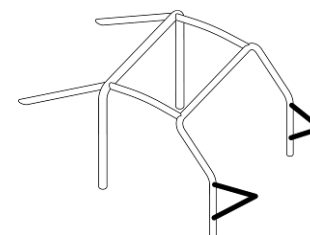
253-25
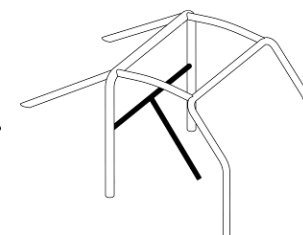
253-26

Type 2 Roll cage (optional additions)
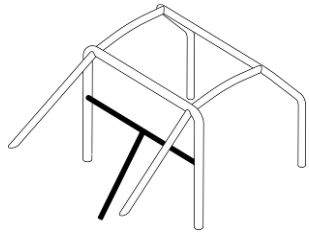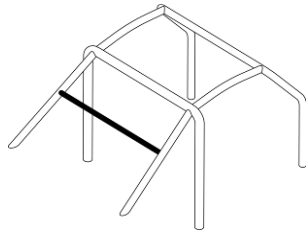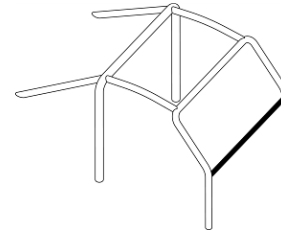
253-27   **253-28**   **253-28B**   **253-29**   **253-30**   **253-31**
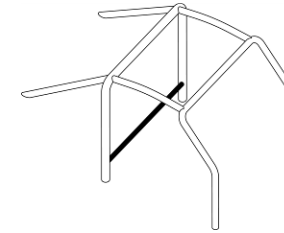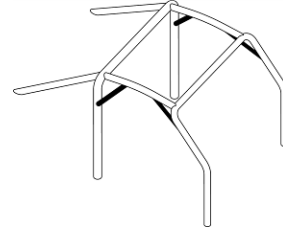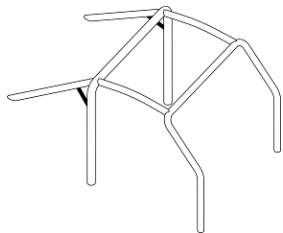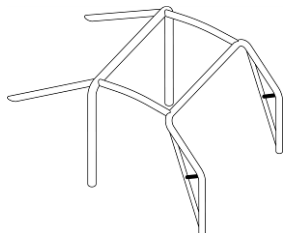
253-32   **253-33**

Type 3 Roll cage (non Appendix J type)

Roll cages that have any of the following items will be classified as **Type 3**

- **Welding to the central structural volume.**

- **More than six mounting feet (unless indicated in Type 2 cage options).**

- **If a structure starts and ends on a roll cage and is not described in Type 1 and 2.**

A WORLD IN MOTION

Chassis structure classification

Chassis structure classes are described below using the following definitions:

- A **central structural volume** is defined as the volume inside:

    o   a vertical plane passing through the forward most part of the front windscreen;
    o   a vertical plane passing through the rear of the rear wheels;
    o   roof, floor, door and side body panels;
    o   for open cars, the interior volume unbounded by the above criteria will be defined as the exterior of the roll cage.

- A **structural member** is a rigid element connecting two or more points of the bodywork and/or roll cage.

- **Bodywork** is defined as the roof, side panels, doors and floor.

- A **roll cage bar** defined by Appendix J, Article 253, Drawing 253-18, will also be considered as a structural member for the purpose of CS2 if any part is within 150 mm of the lower connection point along the axis of the backstay.

A WORLD IN MOTION

Chassis structure classification

CS1	**Chassis structure Class 1**	*No extra structural members*
CS2	**Chassis structure Class 2**	*Structural member(s) between one or both axle strut towers without intermediate connections.*

Type 2 roll cage and CS2 strut structure

CS3	**Chassis structure Class 3**	*Additional structural member(s) to those described in CS2 within the central structural volume.*

CS3 additional structure internal

Chassis structure classification

CS4	**Chassis structure Class 4**	*Additional structural member(s) to members described in CS2 and CS3 outside the central structural volume*

CS4 additional structure external

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