



Balance of Performance Publication

Date: **08.08.2018**

Hankook **24H BARCELONA** 2018 (TCE & GT-Series)

To Sporting & Technical Regulations 24H SERIES power by Hankook 2018, Version 28
September 2017, with KNAF-permit No.: 0314.17.266

Dear Teams and Drivers

In this BOP-publication you will find:

- Balance of Performance (BOP)
- SP-BOP-CAT (Theoretical best lap times).

Applicable for:

- Hankook **24H BARCELONA** (24H TCE SERIES + 24H GT SERIES)

This BOP and other figures are in force with immediate application and replaces the figures of appendix 18 of the Sporting & Technical regulations and eventually previously published BOP-publications.

Notes on boost control:

Control of Pboost strategy as per document attached (Appendix: Control of Pboost strategy), for all cars of which Pboost max is specified, unless explicit otherwise specified.

Approved: 8 August 2018
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Petrol & Diesel Touring cars, up to 3500cc

Class	Cylinder capacity		Minimum Weight	Max Refuelling amount	Remarks	
A2	Diesel cars up to 2000cc		1100 kg	100L	Theoretical best lap time: 2min06 (Barcelona)	
			1200 kg	120L		
	Petrol (up to - 2.000cc)	up to 1.300cc	710 kg	80 L		
		1.300 - 1.400cc	760 kg	80 L		
		1.400 - 1.600cc	820 kg	90 L		
		1.600 - 1.800cc	900 kg	100 L		
		1.800 - 2.000cc	980 kg	100 L		
	Petrol Supercharged engines (up to 1.650cc)	Supercharged engines up to 1.650cc	1000kg	70 L		
Peugeot RCZ 1.600cc / Turbo		1100 kg	80 L			
A3	Petrol (2.000 - 3.500cc)	2.000 - 2.500cc	1000 kg	120 L	Theoretical best lap time: 2min02 (Barcelona)	
		2.500 - 3.000cc	1100 kg	120 L		
		3.000 - 3.500cc	1200 kg	120 L		
	Petrol Supercharged engines (1.650 - 2.000cc)	Peugeot 208 GTI 1.600cc / Turbo	1050 kg	85 L		
		1.650 – 1.800cc	900 kg	100 L		e.g. Lotus Elise 1.8 Turbo
			1000 kg	120 L		e.g. Seat Leon MK1
		1.800 – 2.000cc	1000 kg	90 L		e.g. Seat Leon MK2, Opel Astra (NO TCR cars)
			1100 kg	100 L		
	Diesel 2.000 – 3000cc	2.000 – 2.500cc	1100 kg	85 L		
		2.500 – 3.000cc	1200 kg	85 L		
CUP 1	BMW M235i Cup	3.000cc Twin Turbo	Remarks	Remarks	According to BMW M235i Cup regulations	



Touring Car Production Cars (TCP)

Class	Manufacturer	Model	Cyl. Cap	Max KW*	Minimum weight	Max Refuelling amount	Remarks
TCP1	BMW	E36 325i	2494cc	151	1230 kg	70	
	BMW	325i C	2494cc	151	1255 kg	70	
	BMW	E46 325i	2494cc	151	1255 kg	70	
	BMW	E90 325i L	2497cc	171	1365 kg	70	
	BMW	E90 325i	2497cc	171	1365 kg	70	
	BMW	E92 325i C	2497cc	171	1365 kg	70	
	Daimler/Mercedes	204 C230	2496cc	161	1335 kg	70	
	BMW	Z89	2497cc	161	1335 kg	70	
TCP2	BMW	E86 Z4 coupe	2996cc	209	1300 kg	70	
	BMW	E87 130i	2996cc	209	1300 kg	70	
	BMW	E36 M3 GT	2990cc	232	1400 kg	70	
	BMW	E36 M3	2990	232	1370 kg	70	
	BMW	E90 330i L	2966	214	1330 kg	70	
	BMW	E92 330i C	2966	214	1330 kg	70	
	Porsche	911	2990	188	1300 kg	70	
	Porsche	987 Cayman CQ11	2893	209	1300 kg	70	
	BMW	E90 390L	2996	203	1310 kg	70	
	Porsche	981 CM12	2706	216	1347 kg	70	
	BMW	346C 330CI	2979	182	1300 kg	70	
	BMW	346L 330i	2979	182	1300 kg	70	
	BMW	M3B	2990	225	1370 kg	70	

*The maximum KW mentioned in this table are including 5% tolerance and 2% measuring tolerance.

Class TCR BOP and ECU-software version

Brand & Type	Minimum Weight	Max Refuel amount	Ride height	TCR Technical form Certification Nr. / Variant Option	Power level (%)	SW Name ECU-software version This version overrides the TCR TECH FORM	SW Identification (Checksum or ID)	Max Pboost & Rev limiter
ALFA ROMEO GIULIETTA TCR	1220 kg	100 L	70mm	6	102.5	1.600_TCR2018_BOP_102,5%	1828/1314	See TCR-09*
AUDI RS3 LMS SEQ	1250 kg	100 L	70mm	10 & VO 18 & VO29	100	5F6906259M	CVN	See TCR-09*
AUDI RS3 LMS DSG	1230 kg	100 L	70mm	9 & VO 18 & VO29	102.5	5F6906259L	CVN	See TCR-09*
CUPRA TCR SEQ	1240 kg	100 L	70mm	35 & VO44	100	5F6906259M	CVN	See TCR-09*
CUPRA TCR DSG	1230 kg	100 L	70mm	43 & VO44	102.5	5F6906259L	CVN	See TCR-09*
HONDA CIVIC FK7 TCR SEQ (2018)	1250 kg	100L	80mm	33 & VO34	97.5	TCR_H70_REV_1.02.30	97.5	See TCR-09*
HONDA CIVIC FK2 TCR SEQ (2017)	1250 kg	100L	80mm	11 & VO 20	100	CR-V2.6.98+7.5	100	See TCR-11**
HYUNDAI i30 N TCR	1260 kg	100 L	90mm	27 & VO 28	97.5	V1.606.X1_i30_TCR_BOPv2_975_prod_003.LRC	24960/60966	See TCR-09*
KIA CEE'D TCR	1220 kg	100 L	70mm	TBA	100	1502_Kia_TCR_18_-100%v05	Firmware ID	See TCR-09*
LADA VESTA TCR	1270 kg	100 L	80mm	TBA	100	12.10.1.3	7E02A5EAh	See TCR-11*
OPEL ASTRA TCR	1230 kg	100 L	70mm	TBA	100	12.7.3.30_Bop2_100-prozent	3C41F5B7 3074FB88h	See TCR-09*
PEUGEOT 308 TCR	TBA	TBA	TBA	37	102.5	Soft 12.10.3.0	8D5EDC65h	See TCR-09*
PEUGEOT 308 RACING CUP	1100 kg	100 L	70mm	8	90	T9TCR_12.8.4.7_17S15_90%	3D47360C	2750mbar
RENAULT MEGANE TCR	TBA	100 L	TBA	TBA	100	Soft 12.10.3.0	5C23844Dh	See TCR-09*
SEAT LEON CUP RACER V1 DSG (2015)	1200 kg	100 L	60 mm	TCN2-C-001	100	5F6906259_0001	72 DC 3A 5C	NA
SEAT LEON TCR V2 SEQ (2016)	1200 kg	100 L	70 mm	002	100	5F6906259C (0001)	CVN	NA
SEAT LEON TCR V2 DSG (2016)	1200 kg	100 L	60 mm	004	100	5F6906259B (0001)	CVN	NA
SEAT LEON TCR V3 SEQ	1240 kg	100 L	70mm	16 & VO 17	100	5F6906259M	CVN	See TCR-09*
SEAT LCR TCR V3 DSG	1230 kg	100 L	70mm	15 & VO 17	102.5	5F6906259L	CVN	See TCR-09*
SUBARU STI TCR	TBA	100 L	TBA	TBA	100	2018 mappa 95.m1pkg	CVN	See TCR-09*
VOLKSWAGEN GOLF GTI TCR SEQ (2016)	1210 kg	100 L	70 mm	003	100	5F6906259C (0001)	CVN	NA
VOLKSWAGEN GOLF GTI TCR SEQ	1250 kg	100 L	70mm	14 & VO19, ER36, VO41, SV42, VO40 (Facelift)	100	5F6906259M	CVN	See TCR-09*
VOLKSWAGEN GOLF GTI TCR DSG	1230 kg	100 L	70mm	13 & VO19, ER36, VO41, SV42, VO40 (Facelift)	102.5	5F6906259L	CVN	See TCR-09*

Your (TCR) car not listed here? Please make an individual request to info@creventic.com

***TCR-09: See 2018 TCR TECHNICAL BULLETIN no.9 (Date: 2018, May, 17th)**

****TCR-11: See 2018 TCR TECHNICAL BULLETIN no.11 (Date: 2018, July, 20th)**



Class GT4: GT4 Grand Touring Cars

Brand & Type	Cylinder capacity	Minimum Weight	Max Refuelling amount	Restrictor	Remarks
ASTON MARTIN V8 VANTAGE GT4	4700cc/8cyl	1350 kg	100 L	NA	ECU BOP 2016
Audi R8 LMS GT4	5200cc/10cyl	1480 kg	100 L	2x42mm	Restrictor thickness 5mm. Acc. Audi R8 GT4 restrictor drawing ECU BOP 2018
BMW M3 GT4		1350 kg	100 L	NA	ECU BOP 2015
BMW M4 GT4	3000cc/6cyl Turbo	1460 kg	100 L	2017 USB Powerstick "Silver" (Max Engine power: 440Hp)	
CHEVROLET CAMARO GT4		1450 kg	100 L	60mm	FIA-restrictor design ECU BOP 2018
GINETTA G55 GT4 2015	3700cc/6cyl	1080 kg	100 L	NA	ECU BOP 2015
GINETTA G55 GT4 2017	3700cc/6cyl	1100 kg	95 L	47,5mm	Restrictor: G55-E0392 FIA-restrictor design
KTM X-BOW GT4	2000cc/4cyl Turbo	1130 kg	90 L	Pboost max: 2,3bar Max rpm: 7000 rpm (at all gears)	
LOTUS EVORA GT4		Tba	Tba	Tba	
MCLAREN 570S GT4	3800cc/8cyl Turbo	1440 kg	110 L	Max engine Torque 470Nm Pboost-max: 1,8 bar ECU BOP 2018	
MERCEDES AMG GT4	4000cc/8cyl Turbo	1450 kg	100 L	Pboost-max: 1,75 bar (Max Engine power: 314kW (427Hp)) ECU BOP 2018	
NISSAN 370Z GT4	3800cc/6cyl	1250 kg	100 L	Tba	ECU BOP 2016/2017
PORSCHE 997 CUP GT4	3800cc/6cyl	1250 kg	95 L	NA	ECU BOP 2014
PORSCHE CAYMAN GT4 CLUPSPORT MR	3800cc/6cyl	1290 kg	100 L	ECU 2017 BOP	
PORSCHE CAYMAN PRO4 GT4	3800cc/6cyl	1240 kg	95 L	NA	2016
SIN R1 GT4	6200cc/8cyl	1250 kg	100 L	NA	Max 43,5% Throttle opening
Your (GT) car not listed here? Please make an individual request to info@creventic.com					



Class 991: Porsche 991 Cup classes (Generation I and II)

Class	Brand & Type	Cylinder capacity	Minimum Weight	Max Refuelling amount	Remarks
Class 991	Porsche Cup 991-I	3.800 cc	1220 kg	100L	Models 2014 .. 2016 NO Restrictor-Blende
Class 991	Porsche Cup 991-II	4.000 cc	1240 kg	100L	Models 2017 .. 2018 *Restrictor-Blende: 72 mm

* Restrictor Blende must be according "Manthey TZN" drawing, see 24H Series bulletin

Class 991-BOP-TABLE

BOP- table class 991-PRO & 991-AM

Class*	Balance Of Performance**	
	Weight	Refuelling
991-Am	+/- 0kg	100 L
991-Pro	+ 30kg	90 L

* Class and corresponding BOP is determined by Team composition (Drivers categories)

Please note: In case Class 991-AM and 991-PRO is combined to one Class 991, the BOP, 991-AM-BOP or 991-PRO-BOP is still applicable determined by Team composition (Drivers categories)

** BOP adjusted (+/-) ballast weight and refuelling amount, referred to initial value specified in Appendix 18 (See BOP-publication of the specific event)

Class A6-BOP-TABLE

BOP- table class A6-PRO & A6-AM

Class*	BOP	Balance of Performance**	
		Weight	Refuelling
A6-PRO	BOP-Pro	+ 30 kg	-/- 5 L
A6-AM	BOP-Neutral	+/- 0 kg	+/- 0 L
	BOP-Advantage	-/- 50 kg	120 L

* Class and corresponding BOP is determined by Team composition (Drivers categories)

Please note: In case Class A6-AM and A6-PRO is combined to one Class A6, the BOP, A6-AM-BOP or A6-PRO-BOP is still applicable determined by Team composition (Drivers categories)

** BOP adjusted (+/-) ballast weight and refuelling amount, referred to initial value specified in Appendix 18 (See BOP-publication of the specific event)



GT cars (Mainly GT cars, also American GT's are eligible)

Class A6-Am & Class A6-Pro

Brand & Type	Cylinder capacity	Minimum Weight	Max Refuelling amount	Restrictor*	Remarks
ASTON MARTIN V12 VANTAGE GT3	5900cc/12cyl	1280 kg	110 L	2x41,5mm	FIA-restrictor design
AUDI R8 LMS Ultra	5200cc/10cyl	1245 kg	110 L	2x47,2mm	up to and incl. 2014
AUDI R8 LMS (GT3-038)	5200cc/10cyl	1240 kg	100L	2x39,0mm	Or 1280kg/2x40mm (only for A6-AM) FIA-restrictor design
BMW Z4 GT3	4400cc/8cyl.	1230 kg	105 L	1x70,0mm	
CHEVROLET CORVETTE C6-ZR1	5500cc/8cyl.	1220 kg	100 L	2x31,6mm	LMGTE-2-04
DODGE VIPER CC SERIES 2	8400cc/10cyl	1280 kg	115 L	N/A	Chas #VCC-113
FERRARI 458 ITALIA GT3	4500cc/8cyl.	1260 kg	110L	2x50,0mm	FIA-restrictor design
FERRARI 488 GT3	3900cc/8cyl.	1300 kg	100L	N/A	Max Boost(barA/rpm) 1,47/4000 1,51/4500 1,56/5000 1,60/5500 1,63/6000 1,59//6500 1,54/7000 1,49/>7250
FERRARI F458GT (VdeV1)	4500cc/8cyl.	1230 kg	100 L	2x56,0mm	Chas #2850# Chas #2842#
Ford GT3 (Lambda)	5300cc/8cyl	1220 kg	105 L	1x58mm	FIA-restrictor design
LAMBORGHINI GALLARDO LP560 GT3	5200cc/10cyl	1205 kg	100 L	2x47,2mm	
LAMBORGHINI HURACAN GT3	5200cc/10cyl	1260 kg	100 L	2x39,0mm	FIA-restrictor design
MASERATI GRANTURISMO MC GT3	4700cc/8cyl.	1200 kg	105 L	1x65,0mm	
McLaren MP4-12C GT3	3800cc/8cyl.	1255 kg	115 L	2x36,0mm	Max Boost(barA/rpm) 1,82/4000 1,80/4500 1,78/5000 1,76/5000 1,72/6000 1,65//6500 1,59/7000 1,53/>7500
McLaren 650S GT3	3800cc/8cyl.	Tba	Tba	Tba	Max Boost(barA/rpm) Tba
MERCEDES SLS AMG GT3	6200cc/8cyl.	1330 kg	105 L	2x38,0mm	FIA-restrictor design
MERCEDES AMG GT3	6200cc/8cyl.	1330 kg	105 L	2x36,0mm	FIA-restrictor design
NISSAN GT-R GT3	3800cc/6cyl.	1315 kg	115 L	2x40,0mm	Up to and incl. 2014 Max Pboost 2,05 barA (all rpm)
	3800cc/6cyl.	1280 kg	110 L	2x40,0mm	EVO 2015 Max Pboost 2,0 barA (all rpm)
PORSCHE 997 GT3 R	4000cc/6cyl.	1205 kg	100 L	1x72,0mm	MY2012 or older
	4000cc/6cyl.	1205 kg	100 L	1x60,0mm	MY2013
PORSCHE 991 GT3 R	4000cc/6cyl.	1245 kg	95 L	2x41,5mm	FIA-restrictor design
RADICAL SPORTSCARS RXC TURBO GT3	3500cc/6cyl.	Tba	Tba	Tba	Max Boost(barA/rpm) Tba
RENAULT SPORT RS01 Configuration BOP GT3	3800cc/6cyl.	1220 kg	105L	2x42,0mm	Max Pboost 1,95 barA (all rpm) See also appendix Renault RS01 aerodynamics
SCG 003C	3500cc/6cyl.	1260 kg	115 L	2x35,0mm	Max Pboost 1,95 barA (all rpm)
SRT VIPER GT3-R	8400cc/10cyl	Tba	Tba	Tba	

Your (GT) car not listed here? Please make an individual request to info@creventic.com

* FIA-restrictor design, according FIA-2013/2014/2015/2016/2017/2018 restrictor design



Class SPX Special cars

Class SPX Cars with partly fixed BOP

Brand & Type	Cylinder capacity	Minimum Weight	Max Refuelling amount	BOP*	*In case car will be amalgamated to class A6. Initial BOP will be:
Lamborghini Huracán Super Trofeo Evo2017	5200cc/10cyl	1275 kg	Acc. BOP-table below	2x41,0mm	1275kg/110L/2x42mm
Lamborghini Huracán Super Trofeo Evo2018	5200cc/10cyl	1275 kg	Acc. BOP-table below	2x41,0mm	1275kg/110L/2x42mm
Porsche GT America	4000cc/6cyl	1250 kg	Acc. BOP-table below	N/A	TBA
Porsche 911 GT3 Cup model (991-I) Modified	3800cc/6cyl	1200 kg	Acc. BOP-table below	N/A	TBA
Porsche 911 GT3 Cup model (991-II) Modified	4000cc/6cyl	1250 kg	Acc. BOP-table below	N/A	TBA
Porsche 991 Cup MR	4000cc/6cyl	1250 kg	Acc. BOP-table below	Restrictor: Free	TBA
Vortex 1.0	6200cc/8cyl	1100 kg	Acc. BOP-table below	N/A	1100kg/105 L
KTM X-bow (SPX-special)	2000cc/4cyl.	1000 kg	According BOP-table below @ column 1050 kg	Pboost max is 2,7bar (independent of ambient air pressure) Max rpm 7000 at all gears Ride height is free	1000kg/120L (independent of ambient air pressure) Max rpm 7000 at all gears Ride height is free

For all other SPX cars:

Class SPX-BOP-Table (for this class "Dynamic BOP" is applicable)

Class	SP-BOP-CAT Theoretical Best lap time Category	Minimum Weight 1050 kg	Minimum Weight 1150 kg	Minimum Weight 1250 kg
SPX	1min50 Barcelona (range 1.50 – 1.51)	60 L	70 L	80 L
	1min51 Barcelona (range 1.51 – 1.52)	70 L	80 L	90 L
	1min52 Barcelona (range 1.52 – 1.53)	80 L	90 L	100 L
	1min53 Barcelona (range 1.53 – 1.54)	90 L	100 L	110 L
	1min54 Barcelona (range 1.54 – 1.55) *Initial Max refuelling amount	100 L	110 L	120 L
	1min55 Barcelona (range > 1.55) **BOP-advantage	240 L (120 L @ green 120 L @ code60)	240 L (120 L @ green 120 L @ code60)	240 L (120 L @ green 120 L @ code60)

* This is the initial Max refuelling amount, all teams in class SPX starts with.

** As generally it is difficult or in many occasions not possible to give a car a BOP advantage, also the following BOP can be assigned (according art. 4 chapter II), this is called BOP-advantage.

- E.g. 240 L, meaning:
- 120 L under green, as max refuelling capacity is basically 120 litres
- 120 L during Code 60 (as 120L is 50% of 240). The advantage is obviously.



Class SP2 Special cars

Class SP2 Cars with partly fixed BOP

Brand & Type	Cylinder capacity	Minimum Weight	Max Refuelling amount	BOP / Remarks
Porsche 997	3600cc/6cyl	1150 kg	Acc. BOP-table below	N/A
Porsche 997	3800cc/6cyl	1200 kg	Acc. BOP-table below	Restrictor-Blende: 65mm
GC Automobile V8	6200cc/8cyl	1100 kg	Acc. BOP-table below	N/A
KTM X-bow (SP2-special)	2000cc/4cyl.	1000 kg	Acc. BOP-table below	Datalogger obligatory Pboost max is 2,3bar (independent of ambient air pressure) Max rpm 7000 at all gears Ride height is free

For all other SP2 cars:

Class SP2-BOP-Table (for this class "Dynamic BOP" is applicable)

Class	SP-BOP-CAT Theoretical Best lap time Category	Max Refuelling amount		
		Minimum Weight 750 kg	Minimum Weight 1000 kg	Minimum Weight 1250 kg
SP2	1min55 Barcelona (range 1.55 – 1.56)	90 L	100 L	110 L
	1min56 Barcelona (range 1.56 – 1.57) *Initial Max refuelling amount	100 L	110 L	120 L
	1min57 Barcelona (range > 1.57) **BOP-advantage	240 L (120 L @ green 120 L @ code60)	240 L (120 L @ green 120 L @ code60)	240 L (120 L @ green 120 L @ code60)

* This is the initial Max refuelling amount, all teams in class SP2 starts with.

** As generally it is difficult or in many occasions not possible to give a car a BOP advantage, also the following BOP can be assigned (according art. 4 chapter II), this is called BOP-advantage.

- E.g. 240 L, meaning:
- 120 L under green, as max refuelling capacity is basically 120 litres
- 120 L during Code 60 (as 120L is 50% of 240). The advantage is obviously.



Class SP3 Special cars

Class SP3 Cars with partly fixed BOP

Brand & Type	Cylinder capacity	Minimum Weight	Max Refuelling amount	BOP / Remarks
KTM X-bow (SP3-special)	2000cc/4cyl.	1100 kg	Acc. BOP-table below	Datalogger obligatory Pboost max is 2,3bar (independent of ambient air pressure) Max rpm 7000 at all gears Ride height is free
BMW M3 V8 (4L)	4000cc/8cyl.	1300 kg	Acc. BOP-table below, minus 10 Litre	Datalogger obligatory

For all other SP3 cars:

Class SP3-BOP-Table (for this class "Dynamic BOP" is applicable)

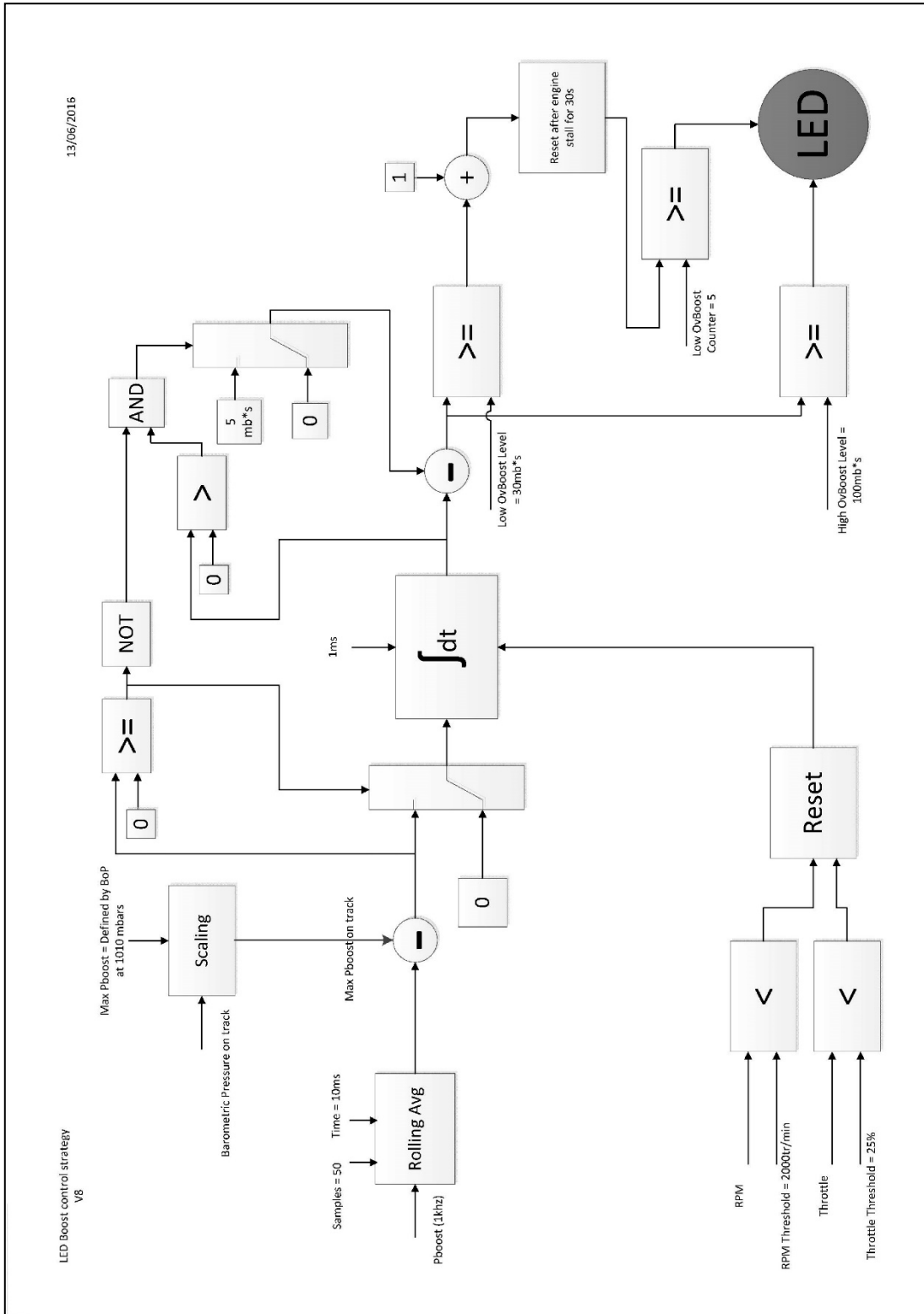
Class	SP-BOP-CAT Theoretical Best lap time Category	Max. refuelling amount				
		Minimum Weight 750 kg	Minimum Weight 1000kg	Minimum Weight 1100kg	Minimum Weight 1200kg	Minimum Weight 1300kg
SP3	1min57 Barcelona (range 1.57 – 1.58)	60 L	70 L	80 L	90 L	100 L
	1min58 Barcelona (range 1.58 – 1.59)	70 L	80 L	90 L	100 L	110 L
	1min59 Barcelona (range 1.59 – 2.00) *Initial Max refuelling amount	80 L	90 L	100 L	110 L	120 L
	2min00 Barcelona (range > 2.00) **BOP-advantage	240 L (120 L @ green 120 L @ code60)	240 L (120 L @ green 120 L @ code60)	240 L (120 L @ green 120 L @ code60)	240 L (120 L @ green 120 L @ code60)	240 L (120 L @ green 120 L @ code60)

* This is the initial Max refuelling amount, all teams in class SP3 starts with.

** As generally it is difficult or in many occasions not possible to give a car a BOP advantage, also the following BOP can be assigned (according art. 4 chapter II), this is called BOP-advantage.

- E.g. 240 L, meaning:
- 120 L under green, as max refuelling capacity is basically 120 litres
- 120 L during Code 60 (as 120L is 50% of 240). The advantage is obviously.

Appendix: Control of Pboost strategy



Appendix: Renault RS01 aerodynamics



PHOTO N° 01

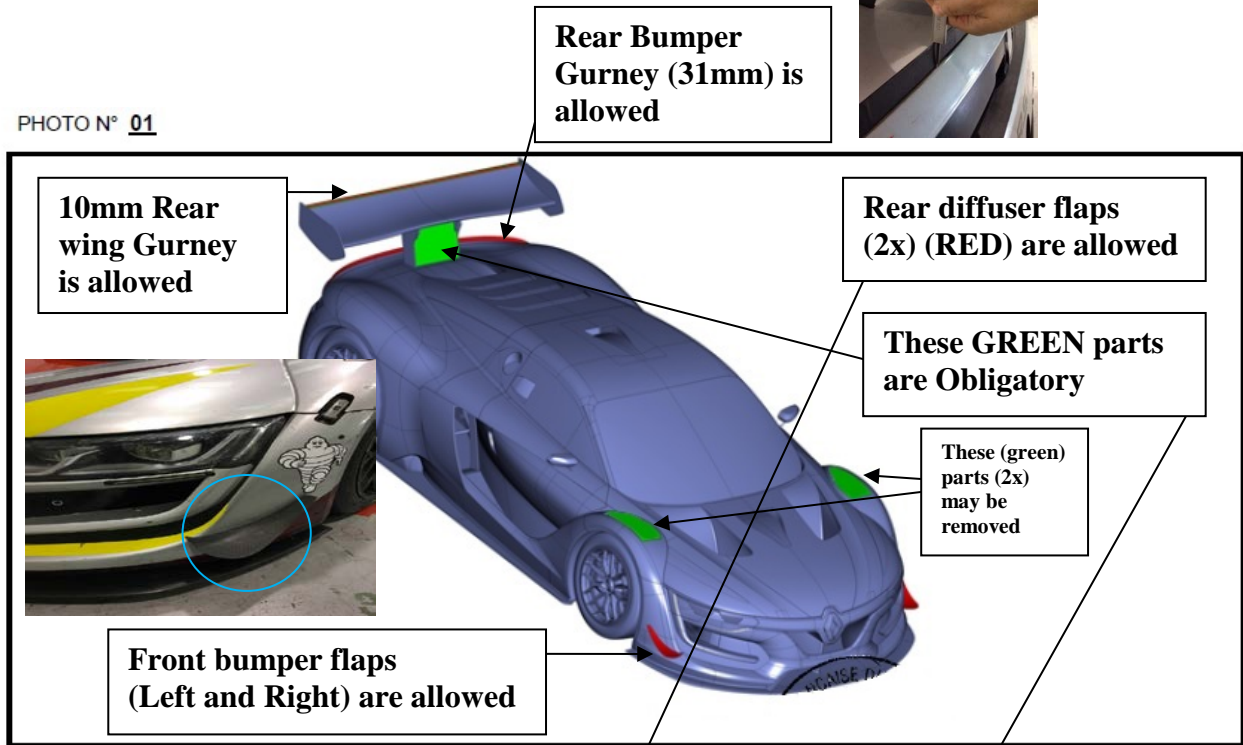


PHOTO N° 02

