

ENGLISH
2019

REGULATION RELATIONS

TECHNICAL

DTM

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Preambles

These technical regulations are binding for all vehicles participating in the DTM 2019; they are registered by the Deutscher Motor Sport Bund e.V. (DMSB registration number 710/2019) and come into effect on 1st January 2019; they replace all other DTM technical regulations.

These regulations are approved by the FIA.

The DMSB will publish modifications, supplements and/or clarifications to these regulations in bulletins.

The following provisions form an integral part of these regulations:

- The following Articles
- Bulletins issued by the DMSB (applicable from the date as specified in the corresponding bulletin).
- The appendices to these regulations
- The technical drawings of these regulations
- The homologation regulations 2019 and the additional homologation regulations 2019
- The valid homologations of the vehicles for 2019
- All data stored on the DMSB server filed under “Mandatory Regulation Data Files 2019” and the dimensions, design prescriptions, weights, manufacturing procedures, manufacturers, materials and shapes prescribed therein.
- All provisions that result from the application of the sporting regulations of the DTM 2019.

Minutes are explicitly not part of these technical regulations.

1. Definitions

Active systems	Any system or any function which monitors one or several parameters (value) in any way and uses one or several of the monitored values to control or influence vehicle components is considered to be an active system. The terms in connection with the control technology according to DIN19226 are the basis for the definition of an active system. The definition particularly includes anti-lock systems, traction control systems, automatic and semi-automatic gearboxes, electronically controlled differential systems or differential systems with automatic control, systems influencing shock absorbers, the suspension or the vehicle's ride height and controlled or regulated moveable masses.
Actual weight	The actual weight of the car at the moment of weighing, with the driver and his personal equipment.
Additional homologation	Binding supplements to the base homologation. The affected components shall be deposited with the DMSB in the form of a reference part, CAD-data and/or drawing.
Air intake openings	An air intake is any opening in the contour to which a closed air duct is directly connected. The end of air intake openings is defined by the intersection which results when the plane KV, moved backwards, closes the opening completely for the first time. The area/surfaces situated in x-direction in front of the moved plane KV are considered to be part of the contour.
Air stream	The speed difference between the vehicle and the ambient air resulting from the forward movement of the driving car. Any air in a closed air duct.
Aluminium	Alloys which refers to groups 1 to 7 according to DIN EN 573. For the interpretation of these regulations, MMC composites are not considered to be aluminium.
Anti-roll bar	EB20-052.100 (front) and EB20-053.100 (rear) Purely mechanical part (without pressure accumulator and components under current), that, through the vertical movement of one wheel, takes influence on the wheel load of the opposite wheel on the same axis.
Appendix J	The Appendix J is the binding text of the technical regulations in the current FIA ISC.

ASN	The national motorsport body of any country affiliated to the FIA and recognised by the FIA as sole holder of the sporting power.
Assemblies	Assemblies are: the engine the gearbox the differential the steering the clutch
Automatic gearbox	A gearbox which is capable of changing gears based on any data constellation and without any intervention of the driver is considered to be an automatic gearbox.
Automobile	An automobile is a land vehicle running on at least four non-aligned complete wheels, of which two are used for steering and two for propulsion.
Auxiliary assemblies	Auxiliary assemblies are: the servo pump for the steering the parts of the engine electric the parts of the mixture control the water pumps the compressor for the paddle-shift system oil pumps
Axis system	A Cartesian coordinate system is applied for the race cars. It is defined as follows x-axis is the vehicle longitudinal axis, positive against the driving direction (= centre axis of the car in longitudinal direction) y-axis is the vehicle transversal axis with the direction resulting from the x- and the y-axis in a coordinate system rotating clockwise z-axis is the vehicle vertical axis showing positively upwards from the reference plane (z=0).
Balance weights	Metal components which compensate the unbalance of rotating masses and serve no other additional purpose.
Base vehicle	The series production car used for homologation.
Blanking	Temporary and local modification of the shape of an air inlet with the sole purpose of modifying the cross-section of an air inlet
Bottom view	View of the car from the bottom, in parallel to the axes.
Bulletin	A document issued by the DMSB in which legally valid modifications of the regulations can be published.
Ceramic	non-metallic solid material comprising an inorganic compound of metal, non-metal or metalloid"
CFRP	Carbon fiber reinforced polymer, carbon fiber reinforced plastic, or carbon fiber reinforced thermoplastic
Closed air duct	A closed air duct comprises the maximum of one air intake port and the maximum of three air outlet ports. These ports must be connected by means of air duct walls made out of homogenous, air-tight materials. Composite materials are considered to be homogenous materials under the above definition. A closed air duct begins at the location where it connects to an air inlet.
Cockpit	The CAD volume within the contour according to article 13
Composite material	A material which comprises one or more of the following fibre materials is considered to be a composite material: Carbon fibres Aramid fibres Glass fibres It is made from at least two separate components, the association of which gives properties to the whole that none of the components possesses separately. Example: Glass fibre + plastics = glass fibre reinforced plastic (GFRP). If different parts consist of one or more continuous laminates (plies), they are considered to be bonded together for the interpretation of these regulations.

Contour	The contour is made up of all areas of the race car which may be licked by the air stream.
Crankshaft centre	The crankshaft centre is at half distance of the straight defined in its length by the bore centres of the engine cylinders with the furthest distance to each other.
Cylinder capacity	The volume swept in equal shares (tolerance $\pm 1 \text{ cm}^3$) by the movement of the prescribed pistons inside the prescribed cylinders of the engine expressed in cubic centimetres (cm^3) is the cylinder capacity. In calculations of cylinder capacity, the number π is held to be 3.1416.
Cylinder head	Component in which the valve seats (inlet and outlet) of the engine are accommodated.
Data version	Numerical, alphanumerical, binary or hexadecimal data which must be calibrated by the competitor which are stored in the memory medium of the corresponding EB component and which are temporarily loaded into the working memory for the purpose of an individual adjustment/ application. The extent of the calibrated data is defined by the manufacturer of the corresponding EB component (e.g. ECU-MS7.4, DDU, PCM, ADR, DRS, marshalling system) and must not be modified. Only the application tools released by the manufacturer of the corresponding EB component are eligible to adjust/ apply the data.
Decorative strips / trim moulding	Decorative strips / trim mouldings are all connected, bonded or screwed parts following the contour above the design line and with a height and/or width of less than 25 mm.
Design line	A virtual circumferential line.
Diffuse air stream	Air stream/air which is not purposefully directed.
Door	The part of the bodywork that opens to give any person access to the Cockpit. For the interpretation of these regulations, hatchbacks are not considered to be doors.
Driver	The person entered for the corresponding race car at the administrative checks of an event.
Driving direction	For the interpretation of these regulations, the driving direction of the vehicle is defined by its forward movement (in race direction) with the steered wheels in the front and the powered wheels at the rear.
DRS – Drag Reduction System	Mechanically/pneumatically controlled device which enables the temporary modification of the angle of attack of the rear wing (part of EB20-023) whilst the car is in motion.
DTM KOMMISSION	The Commission formed by DMSB and ITR overseeing the Sporting and Technical Regulations of the 2019 DTM, with decisive capacity as agreed by the parties.
Engine	Cylinder block, cylinder heads, crankshaft, conrods, pistons, camshafts, inlet and outlet valves with springs, valve train including belts and / or chains, belt pulleys, pinion gears including covers, dry sump, cylinder head cover, water pumps, oil pumps, intake manifolds, intake system, throttle body, fuel-injection system, engine wiring loom and all sensors which are necessary for the operation of the engine. Irrespective of this definition, additional components may be homologated. Irrespective of this definition, the provisions specified in Art. 5.4 are applicable for the determination of the engine weight.
Engine block	Component made out of aluminium which comprises the cylinders and the water jacket.
Exclusion of standards in these regulations	Any prescriptions, definitions and specifications from rules and standards which have not been published by the FIA or by the DMSB (e.g. DIN, EN, ECE, EG, SFI, JIS etc.) are only applicable if specifically referred to in the FIA or DMSB regulations and/or in the present regulations or if their application imperatively results from public law.
Fin	L- or T-shaped profile
Fire-resistant, flame-retarding	Components are considered to be fire-resistant or flame retarding if manufactured in compliance with the conditions in 3.1.1.

Free/exempted	Free or exempted parts may be manufactured by any means and can be modified in all respects. It may also be replaced by another part or parts having the same function. Total freedom is granted as to the design. This means that the part can also be completely removed (not applicable for standard components). Free (free/exempted) components must totally comply with all the provisions of these regulations. The restrictions concerning the use of certain materials are not suspended through the application of the term „free“ and “exempted” in these regulations.
Front view	View of the car from the front, in parallel to the axes
Fuel compartment	The first enclosing volume of the fuel cell (EB20-018 or EB20-109).
Hardtop	Removable or retractable roof whose exterior contour is at no point significantly affected by the preload of an opening mechanism.
Head restraint (FHR)	An FIA approved head restraint complying with standard 8858-2010 or 8858-2002.
Homogeneous material	A homogeneous material is a material of which all of its components have the same characteristics. A homogeneous metal alloy must be made out of components which completely combine or dissolve with each other when melted (homogeneous melt).
Homologated standard production car	The contour serving as a basis for the scaling.
Homologation	Detailed description of components regarding their design, their material, the production process used and the number produced, certified by the manufacturer and submitted to the DMSB.
Intermetallics or intermetallic compounds	Materials out of a connection of two or more metallic elements using a crystal structure, which are is different to the structure of the original components
Listed component (LB20)	Component which is part of the Technical List prepared by the DMSB.
Manufacturer	For the interpretation of these regulations, a manufacturer is an automobile manufacturer with EC, KBA (German Federal Motor Vehicle Registration Agency) or MLIT (Ministry of Land, Infrastructure, Transport and Tourism) approval.
Map Switch	Switch that can be used by the driver while driving and that will change one or more of the following parts/parameter: - Ignition angle - Beginning of fuel injection duration angle - Driver torque demand - throttle valve position/movement - rail pressure - anti lag application -anti lag on/off - lambda - boost stage -wet map activation
Maximum contour	Closed volume which is defined by the permitted maximum dimensions of the race car.
Mechanical components	All components necessary for the propulsion, suspension, steering and braking, as well as all accessories, whether moving or not, which are used for the function of the mechanical components are considered to be mechanical components. Fluid lines and electrical wiring are not considered to be mechanical components for the interpretation of these regulations.
Metal alloy	A metal alloy is a homogeneous material produced through melting and composed of at least two chemical elements, the primary constituents of which are metals. Impurities appearing in the alloy as for example phosphorus, sulphur, nitrogen or iron substances unintentionally appearing during the melting process are not considered to be alloy elements. The description of the alloy is determined by its basic component/s respectively basic element/s. Examples for metal alloys are: alloyed chrome-molybdenum tempered steel 25 CrMo 4, alloyed case hardening steel 18DrNi8, chromium steel X 46 Cr 14, magnesium wrought alloy MgAl8Zn.
Monocoque	Standard component EB20-001 D+J without roll over structure EB20-001.01

One	The numeral defining the number.
One-piece	Component which cannot be separated in two or more parts without the destruction of material.
Original	All parts which are identical in contour and material to parts from an identical standard production car of the same type homologated by the DMSB are deemed to be original.
Personal equipment	Driver overall, balaclava, gloves and underwear Shoes and socks Helmet Head restraint (e.g. HANS®, Head and Neck Support) Microphone and earphones Cooling vest without inlet pipes
Plan view	Vertical view on the car from the top, in parallel to the axes.
Pressure accumulator	Any device or measure capable of pressurizing any substance with more or less than the atmospheric pressure of the ambient air and capable of providing this pressure over any period is a pressure accumulator.
Program version	Functional software of a control unit defining all the control and control algorithms of an electronic device. The functional software is defined by the manufacturer of the corresponding device (e.g. ECU, DDU, PCM, GCU, marshalling system, ADR) and must not be modified in whatever kind.
Push-to-Pass system (P2P)	Systems that can temporarily increase the fuel mass flow.
Race car	Scaled vehicle which has been designed and built in compliance with the provisions of these regulations.
Rear view	View of the car from the rear, in parallel to the axes.
Roof	All points licked by the air stream of parts located above z = 1000mm. Exceptions: The rear wing EB20-023 D+J Parts of the doors Transparent areas of the front, rear and side windows which are located above z=1000mm are not considered to be part of the roof.
Scaled vehicle	Series production cars which have been scaled as specified in Art. 3.5.
Sensor	A sensor is a system or a device which establishes parameters and/or the condition of the vehicle or of vehicle components, without itself taking any influence on the parameters and/or the condition.
Series production car	For the interpretation of these regulations, a series production car is any passenger car with a KBA (German Federal Motor Vehicle Registration Agency) or an EEC registration for German road traffic or the type certification from MLIT (Japan Ministry of Land, Infrastructure, Transport and Tourism), distributed through the normal commercial channels of the manufacturer and which has been built within 12 consecutive months in at least 100 examples and with the following components identical in design and material: Doors Engine bonnet Boot lid Wings/side panels Front and rear end plates Roof panel with or without sunroof Windscreen, side and rear windows Front and rear bumpers including decorative strips and license plate brackets, if fitted. The outer design of the series production car is defined by the design of its contour without any add-on components (as for example rear spoiler, antennas, decorative strips, roof rails, exterior mirrors, etc.). The assessment which add-on components are not part of the contour is at the discretion of the DMSB Technical Delegate during homologation.

	After scaling, the series production car determines the contour of the race car above the design line.
Shape tolerance Round/circular	In all section planes, perpendicular to the centreline, the circumferential line must be between two concentric circles with a specified distance (tolerance).
Shock absorber	EB component (EB20-030/031) dampens the vibrations of the sprung mass.
Side view	View of the car from the side, in parallel to the axes. If no specific side (right or left) is indicated, the side view of any side is relevant.
Sintered materials (Intermetallics/ceramic)	Sintered materials (intermetallics/ceramics) are materials manufactured through a sintering process.
Sintermetall	Material produced by compacting and forming of solid mass particles by heat or pressure without melting it
Special approval	Waiver for a vehicle which does not comply in one or several points with the provisions of these regulations in its base or competition version.
Specification component (SB20)	A component which is subject to construction, design and material specifications which must be implicitly respected.
Specification sheet	Binding component and installation specifications which are part of the technical regulations are filed on the DMSB server in the folder "mandatory regulation data files"
Standard component (EB20/EB Part)	Component which must be obtained from the same supplier in identical configuration and whose use in unmodified form is mandatory for each competing race cars. EB-parts marked D+J may be obtained from two different suppliers.
Steel	Ferrous and carbon alloy which contains less than 2.06 % (by mass) of carbon and in which the mass portion of ferrous is greater than of any other element. Minimum volume weight: 7.5 gr/cm ³ .
Steering wheel	All components which are connected to the car through the quick lock device (EB20-047). Cables up to the first coupling joint are considered to be part of the steering wheel.
Supercharging	Any mechanical or thermo-dynamical means to increase the weight of the charge of the fuel-air mixture in the combustion chambers is considered to be supercharging. For the interpretation of these regulations, ram effect, immovable devices or dynamic effects in the intake and/or exhaust system are not considered to be supercharging.
Systems	For the interpretation of these regulations, each of the following components is considered to be a separate system: Suspension front axle (EB20-052 with all sub-items) Suspension rear axle (EB20-053 with all sub-items) Anti-roll bar front axle (EB20-052.100) Anti-roll bar rear axle (EB20-053.100) Steering (EB20-008 and EB20-057) Brakes with brake circuit front axle (incl. EB20-025.01) Brakes with brake circuit rear axle (incl. EB20-025.02) Clutch (EB20-005) Gearbox with gear shift mechanism (EB20-003 and EB20-016) Differential (EB20-003) Engine electronic control unit (ECU) (EB20-022) Throttle unit Engine Marshalling system (EB20-034) Fuel System (EB20-018)
Telemetry	The transmission of data and/or signals of any kind from or to a station/device outside the car itself or vice-versa whilst the competition car is moving is telemetry. The transmission of voice communication and of images from an official TV camera as well as the data transmission of the marshalling system and the impulse of the official lap trigger is not considered to be telemetry.

Throttle unit Throttle valve Throttle slide	Component that controls through its movement the amount of air admitted to the combustion chambers through the variation of the cross section of the intake manifold.
Transmission	All parts mounted behind the crankshaft which conduct engine forces to the wheels are parts of the transmission. The complete wheels themselves are not considered to be part of the transmission.
Undercut	Areas/surfaces of the scaled vehicle which in plan view are covered by areas/surfaces of the scaled contour.
Vehicle	A vehicle is a locomotive device propelled by its own means, moving by constantly taking real support on the earth's surface, and of which the propulsion and steering are under the permanent control of a driver aboard the vehicle.
Vehicle test stand	A device on which driving and operating states of an automobile can be simulated without that the automobile is moving in accordance to the actual or a theoretical wheel speed. Not included in this definition of a vehicle test stand are: Wind tunnels, provided that no measurements are taken whilst the vehicle engine is running.
Wheel	EB20-072 (rim) with all removable add-on parts (valve, balance weight, tire pressure sensor) and a tire fitted in compliance with the technical and sporting regulations.
Wheel carrier/Uprights	EB20-052.01 (front), EB20-053.01 (rear). One-piece casting to which the wheel bearing is fixed.
Wheel centre axis	The centre axis of each wheel is defined by the half distance between two planes running in parallel to the VA plane and which are in contact with the foremost and the rearmost point (in x) of the wheel.
Wheel cut out panels	The part of the contour of the defined area which is visible in plan view below the design line.
Wheel suspension	All parts whereby wheels are suspended to the vehicle and which are modifying the initial tension of suspension springs and/or are moving an anti-roll bar are parts of the wheel suspension. The suspension must be exclusively composed of the standard components (front: EB20-052, rear: EB20-053), the list components according to the inner sleeve (10.5.1), the outer sleeve (10.5.2) and sleeves according to 10.6b as well as parts listed in the specification sheets under EB20-052 and EB20-053.
Wheelbase	The wheelbase is the dimension x between the central line of the front wheels (VA plane) and the central line of the rear wheels (HA plane).
3D measurement system	Device which allows by whatever means to determine the Position of one or multiple points of an automobile in space and their relative position to the reference points of the monocoque.

2.1. Role of the DMSB

These Regulations are issued by the DMSB as the competent ASN.

2.2 Amendments to the regulations

Changes to these regulations which, in the opinion of the DTM KOMMISSION, will result in a significant modification of the technical design of the vehicles will be published until the 1st of June 2019 at the latest to come into force for the 2020 season at the earliest.

Changes for safety reasons may be issued and come into force at shorter notice. It is at the discretion of the DMSB to decide whether a change becomes necessary for safety reasons.

2.3 Dangerous construction

The stewards of the meeting may exclude a vehicle whose construction is deemed to be dangerous by them or by the technical delegates.

2.4 Compliance with the regulations

The vehicles must comply with these technical regulations in their entirety at all times during an Event.

Should a competitor wish to introduce a new design or feel that any aspect of these regulations is unclear, clarification may be sought from the DMSB.

If the request for clarification relates to any new design or system, the request must include:

A full description of the design or system;

Drawings and schematics;

The competitor's opinion concerning his belief that the corresponding parts/design is admissible in compliance with these regulations;

The competitor's opinion concerning any possible long-term consequences which may come from using and developing any such new designs;

A precise description in which way the new design will enhance the performance of the car.

Appropriate request will be answered by the DMSB within 6 weeks.

The design freedom given by the following regulations shall only be used if none of the parameters fixed in a valid homologation are modified as a result.

2.5 New systems, technologies and interpretations

Any system, any technology, any interpretation or any procedure not specifically covered by these regulations, but which is deemed permissible by the DMSB Technical Delegate of the series, will only be admitted until the end of the season during which the system/ the new technology/ the interpretation/ the procedure was presented to the DMSB Technical Delegate of the series.

The fact that the DMSB Technical Delegates has deemed a part or a design as legal does not release a registered applicant from the possibility of letting the motor sport council decide over the legality.

The DMSB Technical Delegate will inform the DMSB accordingly about the system/ technology/interpretation/procedure in question and about its working principles.

Following this, the DMSB will evaluate whether the system/ the technology/ the interpretation/ the procedure is in line with the philosophy of these regulations. If it is felt that this is not the case, it may be prohibited for the following years.

The corresponding competitor will then be required to submit a full description of the system to the DMSB.

Any system, any technology, any interpretation or any action which is not explicitly described or admitted in these regulations and which in the opinion of the DMSB Technical Delegate of the series is not in accordance with the regulations may not be used.

2.6 Duty of competitor

It is the duty of each competitor to prove that his vehicle complies with these regulations in their entirety at all times during an event.

The design of the car, of its components and of all systems must demonstrate their compliance with the provisions of these regulations by means of physical inspection (L/H/W measurements, weighting, material analysis) only.

2.7 Eligible vehicles

A race car prepared in compliance with these regulations may only be used in DTM Events if on the 1st of April 2019 at the latest:

- a) the DMSB has issued a homologation for a series production car of the same manufacturer and of the same model as a base vehicle.
- b) the DMSB has issued a homologation 2019 for the race car.

The DTM KOMMISSION can also permit vehicles to participate in a DTM event for which a homologation has been issued at later date.

The following requirements must be met by a series production car that shall be homologated as a base vehicle for a DTM race car:

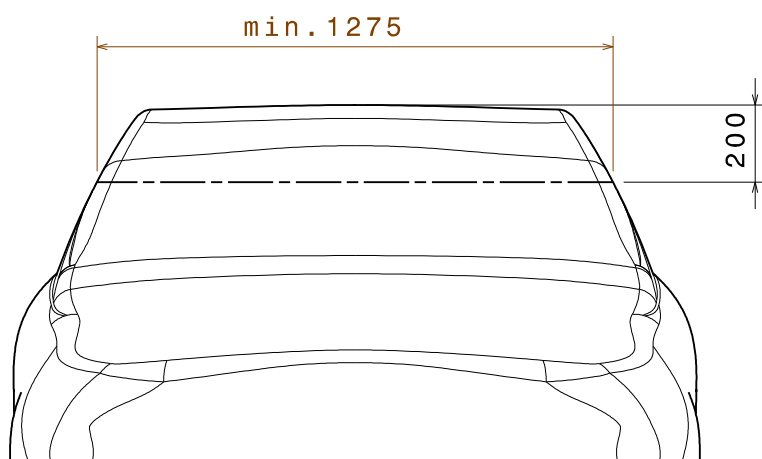
c) At least 100 identical (see homologation requirements 2019) units (vehicles) must have been produced in 12 consecutive months. This minimum number must have been produced before the 31st of December of the year in which the homologation application is submitted to the DMSB. Furthermore at least 500 units must be built in 4 consecutive years.

d) The series production car must have

- I. an EEC registration as a two-, four- or five-seater vehicle. It must have at least two seats side by side in the front or
- II. received type certification from the MLIT-Japan Ministry of Land, Infrastructure, Transport and Tourism (Designated specified vehicle or new model vehicle) and have at least 2 seats side by side in the front.
- III. additionally, Vehicles complying with 2.7 c), d) I and II which have received either EEC registration or MLIT certification may have some modifications as long as none of the modification will lead to a change of the original greenhouse shape.

Any Vehicles have to meet the following conditions:

1. At least 100 identical cars must have been produced in 12 consecutive months.
2. The overall length of the series production car - measured in accordance with Guideline 2007/46/EEC - must be at least 4.300 mm and maximum 4.850 mm.
3. The overall height of the series production car - measured in accordance with Guideline 2007/46/EEC - must not exceed 1.550 mm.
4. The overall width of the series production car - measured in accordance with Guideline 2007/46/EEC – must not exceed 1.950 mm. The width thus defined refers to the vehicle without rear view mirrors.
5. The minimum width of the series production car in front view, 200 mm below the KD plane, is 1.275 mm.



Z1 Minimum width of the series production car at Cockpit height

6. The series production car must have a solid roof, with or without sunroof. For the interpretation of these regulations, a hardtop is considered to be a solid roof.
7. The series production car may have the maximum of two doors on either side of the vehicle.
8. The series production car must be aimed for sale to individual customers through regular sales network in Japan or Europe.
9. The vehicle must be DMSB registered.

If the shape of the bodywork shows any abnormalities which on objective consideration will lead to an aerodynamic advantage the DTM KOMMISSION may reject the homologation application. It is the DTM KOMMISSION decision alone whether the shape will be seen as an advantage or not.

The homologation of vehicles which do not comply with one or more of the aforementioned conditions may be granted in form of a special admission. Only the DTM KOMMISSION is entitled to approve a request for a special admission.

It is the responsibility of the applicant to submit the DMSB all the requested data and information about the vehicle in question. The approval of a special admission may be subject to respecting technical conditions which may differ from the provisions and freedom granted in these regulations.

The DMSB has the right to check compliance with the specifications made by a manufacturer on the homologation form at any time and without giving reasons, by using a series production car of the same type selected by the DMSB. The DMSB has the right to cancel a homologation should the specifications made by the manufacturer turn out to be incorrect.

2.8 Dimensions, measurements and tolerances on the race car

All the components must be designed so that they comply with the relevant dimensions required by these regulations without tolerances. The design must be submitted to the DMSB in form of a CAD data set submitted at the latest at the basic inspection of the car. The submitted data set forms the reference for the verification of the car's technical compliance with the regulations.

Any tolerance possibly accepted for the checking of the dimensions is explicitly mentioned in the corresponding component description, the corresponding specification sheet and/or in the corresponding article of these regulations.

Dimensions for which tolerances are explicitly permitted in the regulations are considered to comply if they are found to remain within the specified tolerance during the inspection of the vehicle.

Exception:

The dimensions of EB20- and SB20- Parts can also be examined when they are not mounted to the vehicle. The decision if a EB20/SB20 Part is examined while mounted to the vehicle or dismounted from the vehicle is at the sole discretion of the DMSB Technical Delegate.

For the purpose of inspecting air licked EB- and SB parts dismounted from the car only the tolerances described in the relevant specification sheets are to be considered. The specification sheets are filed on the DMSB server under "MANDATORY REGULATION DATA FILES".

Examples:

Dimension	Tolerance accepted	Eligible dimension
1.000mm	+2mm	1.000 – 1.002mm
1.000mm	-2mm	998 – 1.000mm
1.000mm	+/- 2mm	998 – 1.002mm
min 1.000mm	No specification	1.000 - ∞
max 1.000mm	No specification	0 – 1.000mm

Table 1

If not explicitly stated otherwise, the following is applicable:
 there is no plus tolerance for maximum dimensions (max.).
 there is no minus tolerance for minimum dimensions (min.).

The accepted tolerance for the mounting position of EB components is ± 3 mm, if not explicitly stated otherwise in the corresponding article or in the corresponding specification sheet.

Exceptions:

For the EB20 component rear wing (EB20-023 D+J) a tolerance of ± 6 mm is permitted for the mounting position.
 For the SB20 component spoiler lip (SB20-004) a tolerance of ± 6 mm is permitted for the mounting position.
 For the EB20 component mirror (EB20-077) a tolerance of ± 6 mm is permitted for the mounting position.
 For the EB20 component floor and rear diffuser (EB20-082 D+J and EB20-078 D+J) a tolerance in z of -3/+6mm, in x and y of ± 3 mm is permitted.
 For the front diffuser (EB20-075 D+J) including VGs and extension fin a tolerance in z of -3/+6mm, in x and y of ± 3 mm is permitted.
 For the front flick (EB20-105) a tolerance in z of -3/+6mm, in x and y of ± 3 mm is permitted.
 For the flick box (SB20-024 and LB20-024) a tolerance in z of -3/+6mm, in x and y of ± 3 mm is permitted
 For the shoebox (EB20-109 D+J) a tolerance in z of -3/+6mm, in x and y of ± 3 mm is permitted.
 For the elephant foot (EB20-106 D+J) a tolerance in z of -3/+6mm, in x and y of ± 3 mm is permitted.
 For the closing plate (SB20-023) a tolerance in z of -3/+6mm, in x and y of ± 3 mm is permitted.
 For the protection stripe (EB20-107 D+J) a tolerance in z of -3/+6mm, in x and y of ± 3 mm is permitted.
 For the barge board box (EB20-108 D+J) a tolerance in z of -3/+6mm, in x and y of ± 3 mm is permitted.
 For the lower wheelhouse rear (EB20-111 D+J) a tolerance in z of -3/+6mm, in x and y of ± 3 mm is permitted.

A tolerance may only be applied for the dedicated dimension.

Tolerances shall not be used to specifically alter or modify contours. It is therefore not permitted for example to alter the position of individual components above the design line as a whole and/or to level or even out the contour along of edges, beads or recesses. The assessment of this is at the discretion of the DMSB Technical Delegate.

The participants/competitors accept that the test platform used by the scrutineers for the technical scrutineering before and/or after the DTM Events forms a plane and horizontal surface in its entirety.

Y-dimensions which are indicated without prefix are respectively applied to both sides of the FL plane.

The specification of the measuring devices ("official measurement device") used by the ASN/scrutineers for measuring the dimensions relevant for the regulations and the software used for the application are stored on the DMSB server and they are available to all registered participants during an event. With the submission of the registration application for a DTM event, the competitor accepts the values established by the scrutineers in application of the official measuring devices.

During the use of the official measurement device a transmission of force in the contact region may occur. The prescribed measurements for the points concerned must also be met during this load application without exception.

2.8.1 Dimensional accuracy of the contour

If not otherwise explicitly regulated a tolerance of $\pm 6\text{mm}$ is applied to all points of the race car contour with regards to the data set filed for the homologation and which are not part of an EB component.

Exceptions:

For points of the contour of the front and rear window a tolerance of $\pm 10\text{mm}$ is applied with regards to the data set of the scaled vehicle filed for the homologation.

For the contour of the vehicle roof a tolerance in z of $-3/+6\text{mm}$ is applied.

Tolerance for standard gaps/separation lines located above the design line = $+2\text{mm}$

The tolerances for the mandatory engine dimensions are specified in Article 5.

2.8.2 Surfaces of components licked by the air

The surfaces licked by the air stream may not have any tangible, regular or irregular repeating form deviations which with objective consideration are deliberately introduced. Relevant are form deviations of technical surfaces according to DIN 4760.

Furthermore, the coefficient of friction/air resistance of the surfaces must be identical in all directions.

2.9 Views

All the views are applied in parallel to the main axes. The following views are applied:

Front view = from the front

Rear view = from the rear

Side view = from the side (from the left and/or the right side, the definition is at the discretion of the DMSB Technical Delegate)

Plan view = from the top

Bottom view = from the bottom.

Terms and conditions which have to be met by one or more of the views above, are only considered to be met if they are met without any deflection/deviation of the line of sight in the required view.

2.10 Standard components (EB20/SB20 components)

The intellectual property rights of the below standard components (EB/SB-parts) prescribed in these regulations belong to ITR e.V. without restrictions.

EB20-001 D+J Monocoque

EB20-002 front subframe

EB20-004 bellhouse
 EB20-006 crasher
 EB20-007 crashbox side
 EB20-018 D Fuel Cell
 EB20-021 headrest
 EB20-027 D seat inlay
 EB20-032 loom
 EB20-035 D+J skidpad frame
 EB20-036 D adapter fuel cell
 EB20-037 side crash adapter front LH/RH
 EB20-038 side crash adapter rear LH/RH
 EB20-052 suspension front
 EB20-053 suspension rear
 EB20-057 steering column
 EB20-064 bump stop
 EB20-075 D+J front diffusor
 EB20-077 mirror
 EB20-078 D+J rear diffusor
 EB20-079 support device FD
 EB20-082 D+J floor
 EB20-091 brake duct front
 EB20-092 brake duct rear
 EB20-094 brake water cooling
 EB20-105 front flick
 EB20-106 D+J elephant foot
 EB20-107 D+J protection strip
 EB20-108 D+J bargeboard box
 EB20-109 D+J shoebox
 EB20-111 D+J lower wheelhouse rear
 EB20-112 D+J air duct rear
 EB20-113 D+J mesh guard
 EB20-115 K6 cam bracket
 LB20-029 knee protector
 SB20-006 engine plate
 SB20-008 engine bracket
 SB20-010 flange plate
 SB20-013 engine mount
 LB20-029 knee protector
 LB20-031 prop shaft flex disc
 LB20-033 propshaft

The following is applicable for all components defined as standard components (EB20 components) in these regulations: EB20 components must comply in their entirety with all the dimensions, designs, materials and weights as well as any other design details and the production processes as submitted to the DMSB and stored on the DMSB server in form of CAD data, design drawings, plybooks and/or descriptions as well as specification sheets (see Article 22.1).

As an alternative to CAD data, design drawings and descriptions, the DMSB may also use EB20 components submitted to the DMSB as a reference. If and which part must be submitted is determined by the DMSB.

The CAD data, design drawings and descriptions of EB20 components submitted to the DMSB and relevant to the regulations will be made available for all registered competitors.

If not expressly different approved EB20 components must be obtained from the one supplier defined for that specific component. Concerning EB-parts marked with "D+J" two different suppliers are defined. In that case competitors are free to use parts coming from one or the other supplier.

Appropriate information about suppliers are stored on the DMSB server and is available for registered competitors.

If one EB-Part is listed by two different number the competitor is free to decide which one out of the two he will use.

No modification/machining of any kind of a standard component is permitted, unless explicitly permitted in these regulations or approved by the DMSB Technical Delegate in writing.

This applies also for EB20 components which are fitted in areas for which there are no design prescriptions (free areas).

Exceptions:

It is permitted to label EB20 components individually by using an engraving machine. The labelling must not result in any change of the function or the property of the EB20 component.

Alternatively, the EB20 component may also be individually labelled by adding an adhesive film. This addition must not result in any change of the function or the property of the EB20 component. The adhesive film shall not be fitted in such a way as to mask/cover gaps.

If an EB20 component is provided with logos or identifications of a manufacturer applied through casting, it is permitted to remove these identifications also through machining, provided that the removal of material is limited to the absolutely necessary dimension/ weight and the function of the EB20 component is in no way modified through this removal.

It is permitted to attach one (1) passive RFID (radio frequency identification) transponder to each standard component. With the exception of parts of the standard suspension (EB20-052/053) the transponders may not be licked by the air stream. The maximum permitted storage capacity is 64 bits per transponder. Any access (read/write) to the storage of the transponder is prohibited whilst the vehicle is in motion. The maximum permitted volume of a transponder is limited by a cylinder with radius of 4mm and a height of 5mm. Competitors are responsible to respect any national radio/frequency law.

Standard components must be mounted and used in compliance with the appropriate installation instructions (x-y-z position in accordance with specification sheet and CAD data set) and operating principle.

Selected EB20 components may be provided with functional DMSB transponders by the manufacturer of the corresponding EB20 component according to DMSB specifications. It is the responsibility of the participants to ensure that at least one of these DMSB transponder per EB20 component remains undamaged and in working order at all times.

The following EB components must be fitted with DMSB transponder:

Component	Number of transponders
Monocoque (EB20-001 D+J)	4
Front/rear crash structure (EB20-006)	1 per crash structure
Side crash structures (EB20-007)	1 per crash structure
Rear wing main profile (EB20-023 D+J)	1
DRS Wing support struts (EB20-028 D+J)	1 per support strut each
Front diffuser (EB20-075 D+J)	1
Rear diffuser (EB20-078 D+J)	2 per diffuser part
Floor (EB20-082 D+J)	2 per floor part
Elephant foot (EB20-106 D+J)	1 per each side
Shoebox (EB20-109 D+J)	1 per each side
Barge board box (EB20-108 D+J)	1 per each side
Lower wheelhouse rear (EB20-111 D+J)	1 per each side

Table 67

Unless no other quantity is specified in the regulations, in all cases the minimum of one and the maximum of one EB20 component must be used for the corresponding function.

If several EB20 components are listed for one and the same function, it is at the discretion of the competitor to select which EB20 components he wishes to use for the corresponding function.

It is prohibited to use other components for functions which are subject to EB20 components or to support or supplement them by these other components. It is thus for example prohibited to take effect on the torsional stiffness of EB20 components through the mounting or the connection of components which are not explicitly permitted or to influence the freedom of movement of EB20 parts. In this context it is also prohibited to affect the ease of operation by any means of movable EB20-, LB20- and/or SB20 Parts.

It is at the discretion of the DMSB Technical Delegates to decide whether or not these conditions are respected.

Pneumatic or hydraulic pressure which is required for the operation of a standard component and/or is created during the operation of a standard component must not be used under any circumstances for any other functions of the car.

Exception:

The pneumatic pressure of the paddle shift system may be used for the activation/deactivation of the DRS.

Visible surfaces of EB20 components may be provided with foils (maximum thickness 1 mm – even if a multi-ply foil is applied) for design purposes only. The functionality or the properties of a standard component must not be altered through the application of foils. It is not allowed to bridge gaps through the use of foils.

Exception:

The maximum thickness of the foil applied to the rear wing (EB20-023 D+J) and the two endplates is 200 µm. At no point must the rear wing surfaces of the wing and the two endplates, which are licked by the air stream, be applied with multilayer foil.

Alternatively, the rear wing and endplates may also be painted, provided that the applied paint is at no point thicker than 200 µm.

It is permitted to provide the standard components EB20-001 D+J, EB20-006, EB20-007, EB20-037 and EB20-038 with a heat protection or stone guard (maximum thickness 10 mm – applicable also in the case of a multilayer protection).

It is permitted to provide the standard component bargeboard box (EB20-108) with a heat protection (maximum thickness 10 mm – applicable also in the case of a multilayer protection), as long as the heat protection is not licked by air stream.

If not otherwise explicitly permitted, it is prohibited to cover the air licked surfaces of EB-parts.

2.10.1 Individual mounting point

If not explicitly permitted or if not an imperative condition for the functioning, the fitting of parts to standard components is prohibited. For the interpretation of these regulations, the term fitting includes positive connections with other components, in addition to screwing, bonding, welding and clamping.

Exceptions:

It is permitted to create an arbitrary number of individual mounting points in accordance with the following provisions for the following components, provided that the provisions of article 2.10.2 are met:

Monocoque	(EB20-001 D+J)
Front diffuser	(EB20-075 D+J)
Rear diffuser	(EB20-078 D+J)
DRS Wing support struts	(EB20-028 D+J)
Elephant foot	(EB20-106 D+J)
Barge board box	(EB20-108 D+J)
Lower wheelhouse rear	(EB20-111 D+J)
Shoebox	(EB20-109 D+J)
Floor	(EB20-082 D+J)
Closing plate	(SB20-023 D+J)

With the exception of points bonded directly to the monocoque no point of an individual mounting point may be licked by the air stream.

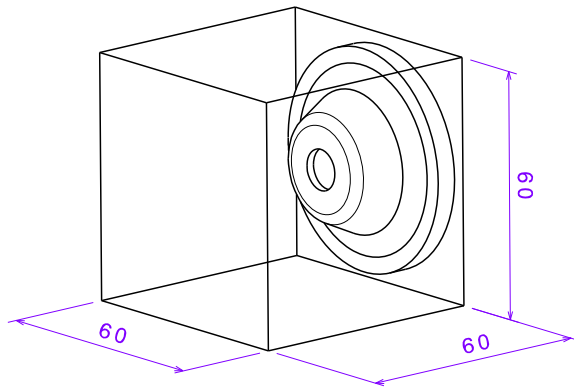
2.10.2 Type of individual mounting points

Only the following individual mounting points are permitted:

a) Bonding pots (in accordance with drawing Z76)

The bonding pots must fit inside a cube with an edge length of 60 mm.

Each bonding pot must not have more than 2 threaded holes (max. M6).



Z76 – Individual mounting point (bonding pot)

b) L- and/or U-profiles

with a maximum side length of 60 mm.

The material thickness of the sides is maximum 2 mm.

The components must always be fixed to the non-bonded sides of the profiles.

The components must always be fixed to the profiles by using screw connections (max. M6) or by using cable ties/tie wraps.

c) Tie wrap bracket

In addition to the mounting points specified above under a) and b), it is permitted to bond individually designed brackets with any kind of bonding material to parts listed under 2.10.1, on condition that the contact/ bonding surface of the bracket is not more than 120 mm².

Only cable ties/ tie wraps made out of plastics may be used to attach components to the tie wrap brackets.

The material of the mounting points is free, CFRP material is specifically allowed.

Any kind of individual bonding is permitted on the monocoque surfaces which are not visible in side, front and/or bottom or rear view respectively in delivery condition.

2.11 Repair of EB20 components

It is permitted to repair damaged EB20 components on condition that, after repair, they still comply with all the dimensions, designs, weights, materials, constructional details and production processes as specified in the submitted drawings and that no property of the EB20 component is changed as a consequence of the repair.

The following is applicable for the repair of EB20 components made out of composite materials:

It is compulsory to inform the DMSB Technical Delegate in writing about the exact extent and method of repair before it is carried out. It is at the discretion of the DMSB Technical Delegate to also approve repaired EB20 components made out of composite materials for further use during a DTM Event if they deviate marginally and locally from the submitted dimensions, weights, designs, materials and/or constructional details due to the repair or if the position of the centre of gravity has changed insignificantly. In this case, the corresponding component, along with a documentation on the work carried out and the facts deviating from the submitted drawing versions, will be made available to all registered competitors and to the stewards of the meeting in form of a technical information at the DTM Event following the repair. A protest against any thus approved and published deviation from the submitted drawing version is not admissible.

The repair of crash elements (EB20-006, EB20-007) and the associated adapters (EB20-037, EB20-038) will only be permitted if there are not safety concerns.

It is at the sole discretion of the DMSB Technical Delegates to decide whether there are safety concerns or not.

For the standard component's front diffuser (EB20-052 075 D+J), rear diffuser (EB20-078 D+J), elephant foot (EB20-106 D+J), shoebox (EB20-109 D+J), barge board box (EB20-108 D+J) and floor (EB20-082 D+J) additional repair provisions are documented in the specification sheets of the respective components.

2.12 Specification components (SB20 components)

The following is applicable for all components defined as specification components (SB20 components) in these regulations:

SB20 components must comply in their entirety with all the dimensions, designs, materials and weights as well as any other constructional details and production processes specified in form of CAD data, design drawings and descriptions submitted to the DMSB and stored on the DMSB server (in folder: "mandatory regulation data files").

This is also applicable if SB20 components are fitted in areas for which there are no design prescriptions.

Unless no other quantity is specified in the regulations, in all cases the minimum of one and the maximum of one specification component must be used for the corresponding function.

If several specifications are listed for SB20 components, it is at the discretion of the competitor to select the specification for the production of the component. In no case may the component be manufactured in application of several specifications.

Exception:

It is permitted to apply specifications which are marked as „repair specification“ in combination with another specification.

SB20 components must be fitted and used in accordance with the appropriate installation instructions (x-y-z positions) and operating mode stored and published on the DMSB server.

If need be dimensions, materials and design may be totally or partly free for defined areas/ surfaces of SB20 components.

The application of this freedom may in no case be used to take effect on the function intended for the SB20 component and/or to modify the mandatory designs, dimensions and weights of the SB20 component.

It is prohibited to use, to support or to supplement the operating mode of specification components through other components. It is at the discretion of the DMSB technical delegate to decide whether or not these conditions are respected.

If not otherwise explicitly permitted, it is prohibited to cover the air licked surfaces of SB20-parts.

2.13 Listed components (LB20 components)

These are components which were included in the DMSB technical list (see table 65) on the 15th March 2019 and the use of which is mandatory or optional for specified functions in accordance with these regulations. If several components are listed for the same function, the competitor is free to choose which of the listed components he wishes to use. A LB20 component must in all cases be used for the corresponding function only.

It is not permitted to influence the function of a LB20-part through other components which are not explicitly allowed in any way.

A LB20 component must in no way be modified. The reference parts or data sets submitted to the DMSB will be taken as reference.

Exceptions:

It is permitted to label LB20 components individually by using an engraving machine. The labelling must not result in a change of the function or the property of an LB20 component.

Alternatively, a LB20 component may also be individually labelled by adding an adhesive film. This addition must not result in a change of the function or the property of the LB component.

Any inclusion of a component on the DMSB technical list after the 15th March 2019 is subject to the approval of the DTM KOMMISSION which shall also decide whether its use is compulsory or optional for the year 2019.

2.14 Prohibited measures

The implementation of any measure permitted by these regulations must not result in a prohibited measure.

3. Aerodynamics, contour and dimensions

Amongst others the following components listed in the table 49 below are EB20-components relevant for this article:

Part-Name	Part-Number
Front-Diffuser	EB20-075 D+J
Heck Diffuser	EB20-078 D+J
Floor	EB20-082 D+J
Skid-Pad frame	EB20-035 D+J
Rear wing	EB20-023 D+J
Mirror	EB20-077

Front brake duct	EB20-091
Rear brake duct	EB20-092
Front flick	EB20-105
Elephant foot	EB20-106 D+J
Protection strip	EB20-107 D+J
Barge board box	EB20-108 D+J
Shoebox	EB20-109 D+J
Lower wheelhouse rear	EB20-111 D+J
Air duct rear	EB20-112 D+J
Mesh guard	EB20-113 D+J
K6 cam bracket	EB20-115

Table 49

Amongst others the following components listed in the table 49a below are SB20-components relevant for this article:

Flick box	SB20-024
Wheel arch front	SB20-026
Wheel arch rear	SB20-028
Wheelhouse front	SB20-025
Wheelhouse rear	SB20-027
Closing plate	SB20-023
NACA duct driver cooling	SB20-030

Table 49a

Amongst others, the following components listed in the table 49b below are LB20-components relevant for this article:

Flick box	LB20-024 (a, b, c, d, f*)
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Table 49b

*one per manufacturer/brand participating

3.0 General bodywork (applicable for the complete bodywork, above and below the design line)

All surfaces of the race car which are licked by the air stream must be homologated by the DMSB. Only one homologation is permitted for each car make. During the term of validity of the homologation, homologated parts must not be modified in their shape and material or in their installation position, unless otherwise specifically specified.

Homologated surfaces may be provided with foils (maximum thickness 1 mm – even if a multi-ply foil is applied) for design purposes only. The functionality or the properties of a component must not be altered through the application of foils. It is not allowed to bridge gaps through the use of foils. Foils shall not be used to specifically alter or modify contours.

In order to comply with the conditions, set out in these regulations, the homologated series production car must be scaled in compliance with the conditions set out in Article 3.5.

If not otherwise explicitly defined the contours, dimensions and/or shape of the scaled vehicle serve as a reference for all contours, dimensions and/or shapes of the car which are situated above the design line.

Exception:

For the areas marked in green in drawing Z2c and Z2d which result from the contour of the design line and the intersection of the scaled vehicle with the surfaces according to "SB20-2018 spec surfaces" the contours, dimensions and/or shape of the scaled vehicle also serve as the reference below the design line.

Sunroofs, Removable rear wings, rear wing supports, standard exterior mirrors and/or rear spoilers, if present, must be removed before the scaling and are thus not part of the scaled vehicle and/or the race car.

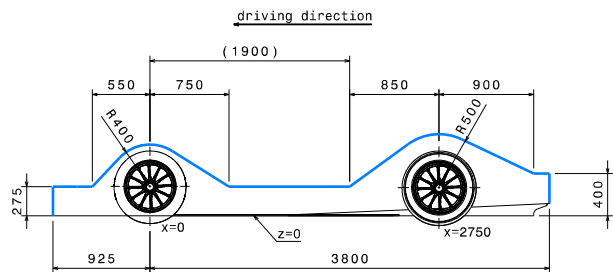
It is at the discretion of the DTM KOMMISSION to determine which vehicle parts fall under these terms and will be defined in the scope of the homologation of the series production car.

It is permitted to remove decorative strips and license plate brackets before the scaling. Apertures possibly resulting as a consequence must be closed before the scaling, following the immediate contour.

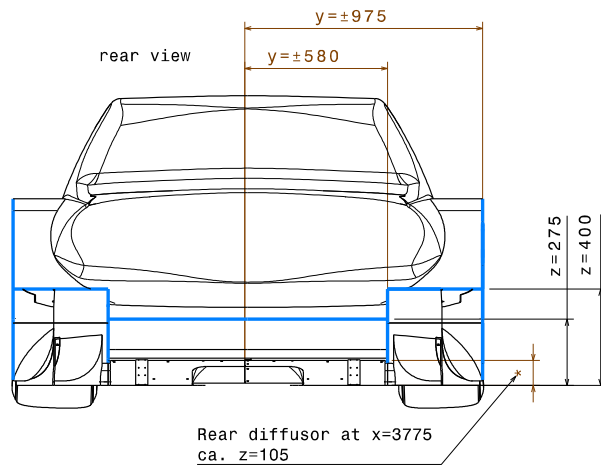
For the purpose of the interpretation of these regulations, the race car is divided in two parts:

- above the design line
- below the design line

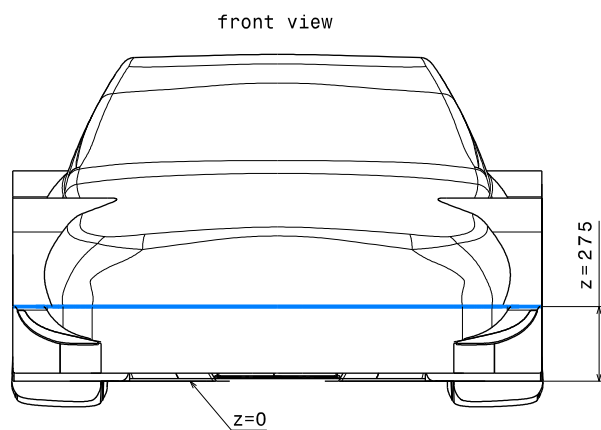
The design line results from the characteristics of the blue line in the below drawings Z2, Z2a and Z2b.



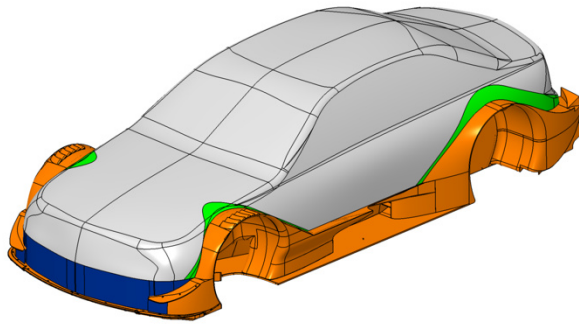
Z2 – Design line characteristics



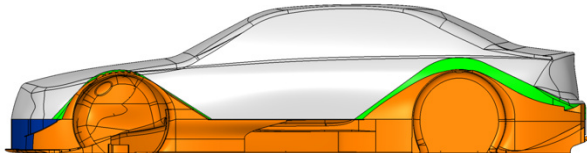
Z2a – Design line characteristics – rear view



Z2b – Design line characteristics – front view



Z2c – Areas (green) for which the scaled vehicle serves as a reference for contours, dimensions and/or shape also below the design line



Z2d – Areas (green) for which the scaled vehicle serves as a reference for contours, dimensions and/or shape also below the design line

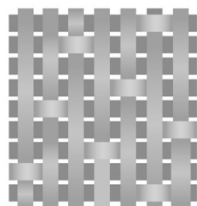
3.1.1 Material specification

Composites (of individual and SB20 components) must comply with the following material specifications, unless explicitly specified otherwise:

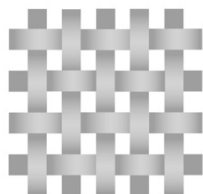
- a) Solely filaments (fibres) made out of carbon, glass and/or aramid are permitted.
- b) The filament used may have a maximum tensile strength of 5.0 GPa.
- c) The weave characteristics of the filament must comply with a design corresponding to drawing Z5.
- d) The permitted maximum tensile modulus of the filament (single fibre) is 265 GPa.
- e) The wall thickness must be minimum 0.4 mm and maximum 3 mm.
- f) The plies of a CFRP component must be completely woven from rovings with at least 3,000 filaments (3K) per roving.
- g) There are no requirements with regard to the number of filaments for plies made solely out of aramid and/or glass.
- h) A core material between the plies is permitted.
- i) The material for the core is free. The core must be minimum 2 mm and maximum 10 mm thick and it must be completely enclosed by laminated fabric.
- j) The fabric used must be woven as specified in drawing Z5.

Exception to e):

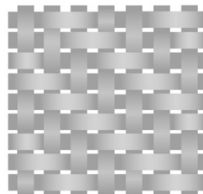
The wall thickness for the contour parts visible in the below drawing Z3 in any view, extending up to $z=850$ mm and marked blue, is minimum 0.8 and maximum 3 mm. This exception does not apply for the boot lid limited by the separation line of the scaled vehicle and for closed air ducts.



Satin

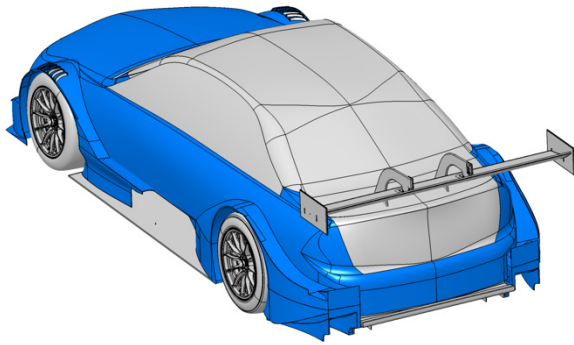


Plain

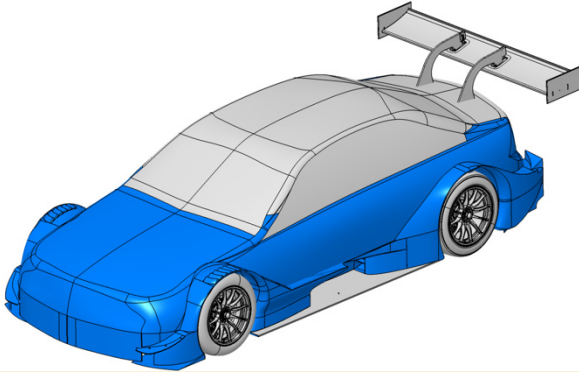


Twill

Z5 Eligible weave and layer characteristics of the permitted filament



Z3 – Areas in which the wall thickness of composite materials must be at least 0.8 and maximum 3 mm.



Z3a – Areas in which the wall thickness of composite materials must be at least 0.8 and maximum 3 mm.

3.1.1a Permitted plies

In terms of this article, four different plies are permitted:
 Carbon fibre ply (consisting of identical roving's and resin)
 Aramid ply (consisting of aramid and resin)
 Core layer (consisting of core materials)
 Hybrid ply (consisting of different roving's and resin)
 Glass fibre ply (consisting of glass fibres and resin)

The conditions specified in article 3.1.1 and 3.1.1a are not mandatory for parts made out of composite materials which are homologated together with the engine.

3.1.2 Air ducts

Unless otherwise not explicitly permitted any airstream within the maximum contour and within the mirror box must comply with at least one of the following provisions:

A1) if not otherwise explicitly permitted the air streams must be defined and pass in full through a closed air duct up to its defined point of use (destination).

A2) if not otherwise explicitly permitted all surfaces licked by the air stream must be visible in plan view.

Exception to A1):

The cooler for the hydraulic oil of the steering system can be positioned inside any defined air duct. The position can be before its point of destination.

A closed air duct comprises the maximum of one air intake port and the maximum of three air outlet ports

A closed air duct begins at the point where it connects to an air inlet opening/intake port (sole opening through which all air must pass into the joining duct). The interface between the air inlet opening and the closed air duct defines the beginning of the duct.

A closed air duct ends at its air outlet ports/outlets (an outlet port/outlet through which solely air passes which has entered the upstream duct through an air inlet opening). Between an air outlet opening and the destination the air may not be specifically guided.

Unless otherwise explicitly permitted, solely one closed duct is permitted per defined air stream.

The air inlet opening of an air duct must be situated in x direction in front of the air outlet of the corresponding air duct.

3.1.2a guiding air

It is not permitted to define a destination that guides air or an air stream specifically.

Exception to 3.1.2a:

The cores of permitted coolers may be defined as a destination.

3.1.2b air inlet connection

Closed air ducts must be connected directly to homologated air inlet openings in the contour.

Exception to 3.1.2b:

Air inlet openings of closed air ducts which are legally located inside another closed air duct do not have to connect directly to a homologated air inlet opening

3.1.3 Permitted air streams

Solely the below definitions for air streams and destinations are eligible.

a) Combustion air (air fed to the engine for combustion.)

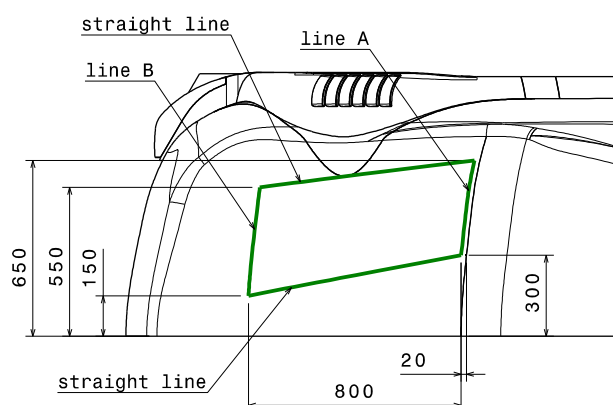
The turbo charger is considered to be the destination for combustion air.

All Combustion air must completely pass through an air duct of which any air inlet port is located in front of $x = -600$

b) Engine cooling air (for liquid cooling)

The openings in the front bonnet (Art. 3.12.1) are considered to be the destination for the engine cooling air. Air stream which is defined as engine cooling air must first of all completely pass in a closed duct through the radiator core (SB20-007) and/or the core of the engine oil cooler and/or the net of the intercooler (SB20-029) and subsequently pass completely through one of the two apertures in the front bonnet prescribed for this purpose (see Art. 3.12.1 and drawing Z18) to be discharged from the contour. The maximum of two closed air ducts is permitted for engine cooling air.

All parts of an engine cooling air duct which are located in plan view below the mandatory outlet opening and are licked by the air must be visible in plan view. Protective screens according to 3.1.4c which may be present are part of the engine cooling air duct.



Z18 - Eligible area for the radiator ventilation opening on the front bonnet

Exception:

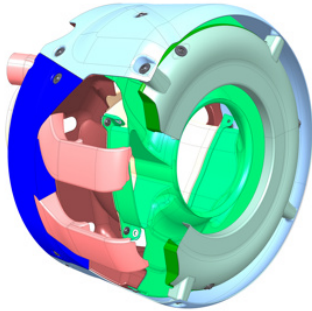
parts of a duct in accordance with 3.1.3 b) which in top view are covered by another duct in accordance with 3.1.3 p) must not be visible in plan view.

c) Brake cooling air (front)

The completely mounted EB20-091 (front brake duct) at the front axle is the destination for the brake cooling air. The air stream which is defined as the brake cooling air must be directed entirely into the EB20-091. The cross section of the air intake opening may (per duct) not be less than 100 cm². One closed air duct for brake cooling air is mandatory for each front wheel. The duct for the “brake cooling air (front)” may be made out of two different homogenous materials.

The outer shape of parts of the cooling duct located inside the wheel house must have a circular cross section. The cooling duct may be attached to EB20-091 under the provision that no air licked surfaces of EB20-091 are covered with the exception of the surfaces provided for the attachment of the duct. For the attachment of the duct to EB20-091 only commercially available hose clamps may be used.

See also design specification article 11.6.



Z91 – EB20-091 Front brake duct

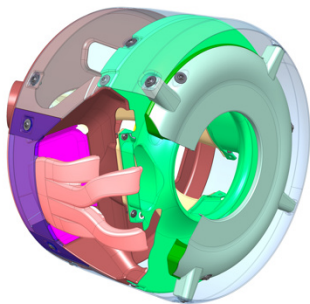
d) Brake cooling air (rear)

The completely mounted EB20-092 (rear brake duct) at the rear axle is the destination for the brake cooling air. The air stream which is defined as the brake cooling air must be directed entirely into the EB20-092. One closed air duct for brake cooling air is mandatory for each rear wheel.

The cooling duct may be attached to EB20-112 D+J and EB20-092 under the provision that no air licked surfaces of EB20-112 D+J/EB20-092 are covered with the exception of the surfaces provided for the attachment of the duct. For the attachment of the duct to EB20-092 only commercially available hose clamps may be used.

The duct for the “brake cooling air (rear)” may be made out of two different homogenous materials.

Only air which has flown through the air inlet opening (EB20-112 D+J) intended for brake cooling may enter into the rear brake duct (EB20-092).

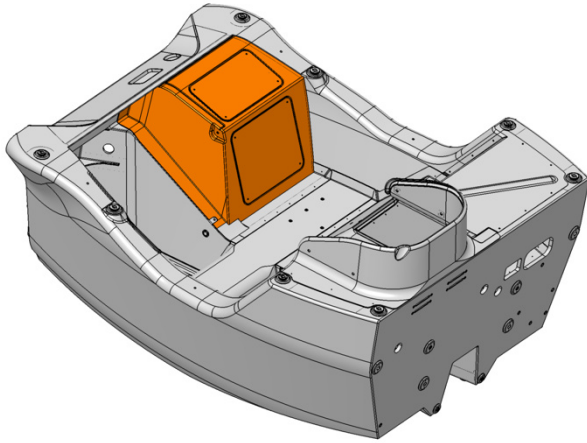


Z91a – EB20-092 Rear brake duct

e) Driver cooling air

The cockpit and/or the service box are the destination for the driver cooling air.

Driver cooling air and/or the air used for the operation of a driver cooling device must completely pass into the Cockpit and/or the service box and exit through the permitted openings in the rear window.



Z7 – Service box (brown) part of EB20-001D+J

A maximum of two closed air ducts for driver cooling are permitted.

For each driver cooling duct the following applies:

The air inlet opening must be located within the area defined in article 3.21.5c and/or within the standard cooling air intake (radiator grille)

The air outlet openings must be located between $x=450\text{mm}$ and $x=1.500\text{mm}$

Parts of driver cooling ducts located outside the volume define in article 13 are not considered to be part of the Cockpit

The entire air stream of the driver cooling ducts must be directed into the Cockpit and/or the service box.

The number of outlet openings of the driver cooling ducts is not limited.

The cross section of the driver cooling duct may at no point before $x=450\text{mm}$ be smaller than 10.000mm^2 .

The cross section of the driver cooling duct may at no point between $x=300\text{mm}$ and $x=450\text{mm}$ be larger than 30.000mm^2 .

If two driver cooling ducts are homologated, the requirements above regarding the cross section are valid for the sum of the cross sections of both ducts.

As an alternative of having the driver cooling air inlets within the area defined in article 3.21.3 it is allowed to place a (1) NACA-style opening in accordance with SB20-030 below the scaled contour of the front bonnet and to cut out the bonnet along the intersection between SB20-030 and scaled contour. If SB20-030 is installed, no other opening may be used for the purpose of driver cooling.

All areas of SB20-030, licked by the air stream, will become part of the contour. It is not allowed to homologate any virtual blanking or protective screen surface on top or inside the NACA.

All air passing through the NACA must be used for the purpose of driver cooling alone. The NACA must be located entirely within the following area, while the NACA centre plane which cuts the NACA into two symmetrical parts, must be parallel to the y-plane:

x	y	z
-200 to 400	-220 to 220	along intersection SB20-030 and scaled contour

The cross section of the NACA style air inlet will be seen as 10.000mm^2 .

If a helmet and/or seat ventilation is used it is permitted to direct the required air stream inside a closed air duct from the air outlet opening of a driver cooling duct to the helmet of the driver and/or the seat.

Air for the helmet ventilation must be directed in full into the helmet shell.

The air stream of the exhaust air from the helmet and/or seat ventilation may only be influenced by the first volume surrounding the driver.

The venting (air exit) of the Cockpit must be performed through the openings in the rear window.

The design and execution of the driver/cockpit cooling/ventilation system and the demisting system must lead to no other function or effect other than to ventilate the Cockpit and/or to prevent the windows from misting up.

f) Exhaust manifold cooling air

The exhaust manifold is the destination.

The air stream which is defined as exhaust manifold cooling air must pass through a closed air duct whose air openings must be completely located within following areas.

	x	x	y	Y	z
Inlet	-925	0	-650	650	free as long as duct satisfies regulations
Outlet	min -200		max 650		

Table 2

A Turbo charger cooling duct is permitted separately from exhaust manifold cooling duct with the same condition as exhaust manifold cooling duct. The turbo charger (EB20-070) is the destination.

g) Gearbox oil cooling air

The radiator core of the gearbox oil cooler(s) is considered to be the destination. The entire air stream defined as gearbox oil cooling air must completely pass through the radiator core of at least one of the mandatory oil coolers (LB20-014, LB20-014.1, LB20-14.2). Behind the destination the air must be directed diffusely up to a permitted opening in the area of the rear skirt (see 3.21.6). It is solely at the discretion of the DMSB Technical Delegate to assess if the air is directed diffusely according to these regulations.

Only air which has flown through the air inlet opening (EB20-112 D+J) intended for gearbox oil cooling may be directed onto the cooling core of the gearbox oil cooler.

h) Shift compressor cooling air

The air compressor of the shift system (LB20-016) is considered to be the destination. The air duct must have only one air outlet. This outlet must not be located further than 50 mm away from the radiator of the compressor. At a point which is located at least 100 mm behind the intake opening but in front of the destination the air duct must have an undivided, circular cross section maintained over a distance of at least 50 mm with a maximum diameter of 30mm through which all air entering the duct through the air inlet opening must pass.

After the destination the shift compressor cooling air must be discharged diffusely. The air duct may pass through the AR2 plane.

The air intake opening may be located inside any other arbitrary homologated air duct.

Only air which has flown through the air inlet opening (EB20-112 D+J) intended for shift compressor cooling may be directed onto the shift compressor (LB20-016).

i) Clutch cooling air

The inside of the clutch housing (EB20-004) is considered to be the destination for the clutch cooling air. The air stream which is defined as clutch cooling air must completely pass through the aperture provided for that purpose into the clutch housing. At a point which is located at least 100 mm behind the intake opening the air duct must have an undivided, circular cross section maintained over a distance of at least 50 mm (restrictor) with a maximum diameter of 50mm through which all air entering the duct through the air inlet opening must pass.

The clutch cooling air must thereafter be discharged diffusely.

Only air which has flown through the air inlet opening (EB20-112 D+J) intended for clutch cooling may be directed through a closed duct into the bellhouse (EB20-004). For the case that no clutch cooling air is defined and no closed air duct is installed between EB20-112 D+J and the bellhouse (destination) the air circulation resulting from the rotation of the clutch is not considered to be an airstream for the interpretation of these regulations.

j) Exhaust

The exhaust system is considered as a closed air duct beginning at the cylinder head. The outlet opening of the duct must be completely located on the right side of the car in an area which is limited by:

x	x	z	z
1.350	1.600	275	425

Table 5

k) Cooling of the exhaust system

Parts of the exhaust system are considered to be the destination for the exhaust system cooling air. All air entering the duct must have passed the opening that was provided for that purpose, located inside EB20-108R. No other opening may be used. The outlet opening of the exhaust system cooling duct must be located in an area which is limited by:

x	z
1.350	275
2.000	425

Table 6

Beside the opening to carry the exhaust outlet pipe through the contour, ventilation louvers may be designed in the area defined in Table 6. Beside the exhaust no mechanical component must be visible through the louvers in side view. No part of the louvers may be located outside of scaled contours.

A (1) exhaust system cooling duct is permitted on the right side of the vehicle only.

The inlet opening of the exhaust system cooling may be located inside the lateral air duct (in accordance with 3.1.3 p and 3.21.2).

l) Alternator cooling

The immediate surroundings of the alternator (EB20-014) are considered to be the destination for the alternator cooling air. At a point which is located at least 100 mm behind the intake opening the air duct must have an undivided, circular cross section maintained over a distance of at least 50mm (restrictor) with a maximum diameter of 50mm through which all air entering the duct through the air inlet opening must pass. The alternator cooling air must be discharged diffusely.

Only air which has flown through the air inlet opening (EB20-112 D+J) intended for alternator cooling may be directed onto the alternator (EB20-014).

m) Optional cooling/ optional air ducts

For each vehicle three individual air ducts (optional air duct) may be used for which three individual destinations can be defined (one per duct) for the corresponding air stream which must be located in front of the AR2 plane.

The destinations of an optional air duct may not be defined as destinations for other air ducts and must be located at least 100mm from parts which are licked by the air stream.

An air duct which leads to an individual destination must at a point which is located at least 100 mm behind the intake opening of the duct must have an undivided, circular cross section maintained over a distance of at least 50mm with a maximum diameter of 50mm through which all air entering the duct through the air inlet opening must pass. After the destination, the optional cooling air must be discharged diffusely.

The air outlet openings of an optional cooling duct must be located behind $x=-200$. If three optional cooling ducts are used, all air outlet openings of two of the three ducts must be located behind $x=0$. No part of an optional air duct may be located behind the AR2 plane. The air inlet opening of an optional air duct must be located within another air duct.

n) tbd

o) Propshaft cooling duct

The transmission tunnel in front of $x=1.500$ is the destination for the propshaft cooling duct which at a point located at least 100 mm behind the intake opening of the duct must have an undivided, circular cross section maintained over a distance of at least 50mm with a maximum diameter of 50mm through which all air entering the duct through the air inlet opening must pass.

Behind $x=1.500$, the cardan cooling air must be discharged diffusely. For the interpretation of this regulation, the transmission tunnel and the area behind the monocoque are not considered to be a closed duct.

The air intake opening of the cardan cooling duct may be located within any other defined air duct.

p) Cooling air for the combustion air

The openings in the front bonnet (Art. 3.12.1) are considered to be the destination for the combustion air cooling air.

Air stream which is defined as combustion air cooling air must first of all completely pass in a closed duct through the intercooler core (SB20-029) and subsequently pass completely through the apertures in the front bonnet prescribed for this purpose (see Art. 3.12.1) to be discharged from the contour. The maximum of two closed air ducts is permitted for combustion air cooling air. The maximum number of outlet ports used for cooling air for combustion air is limited to one per duct.

All parts of an engine cooling air duct which are located in plan view below the mandatory outlet opening and are licked by the air must be visible in plan view. Protective screens according to 3.1.4c which may be present are part of the engine cooling air duct.

Exception:

parts of a duct in accordance with 3.1.3 b) which in top view are covered by another duct in accordance with 3.1.3 b) must not be visible in plan view.

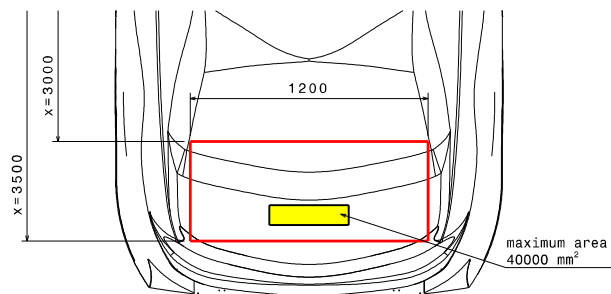
q) Cooling air for the Condenser of Air Conditioner (use permitted for races > 200km only)

The core of the Condenser of Air Conditioner (LB20-022) is considered to be the destination for the cooling air. Airstream which is defined as cooling air must completely pass through the Condenser of Air Conditioner.

Cooling air for the Condenser of Air Conditioner must be introduced from the air inlet opening area which may be a maximum of 40.000mm² and must be located in an area which is limited by (see drawing Z127):

	x	x	y	y
Intake area	3.000	3.500	-600	600

Table 7



Z127 – Intakte port for the air conditioner cooling air

It is permitted to modify the opening edges of the rear bumper within a 20mm wide strip by a maximum of 10mm in positive z-direction under the condition that the air inlet opening for air conditioner condenser complies with the regulation.

With the exception of parts of the air duct that can be seen in plan view through the air condition air inlet, no other part of the air conditioning system may be seen in in plan view.

r) discharge of cooling air for the Condenser of Air Conditioner

Airstream which is defined as cooling air for the Condenser of Air Conditioner must completely pass through the Condenser of Air Conditioner and must be discharged diffusely directly behind the core of for the Condenser of Air Conditioner. The cooling air must be discharged diffusely through the area allowed in the rear skirt (see art.3.21.4 and drawing Z47a).

s) Common air intake ports

It is permitted to use a common air intake opening for the air ducts defined in 3.1.3 g), i) and l).

t) Penetration of air ducts / components within air ducts

If not explicitly allowed no components may be located within closed air ducts.

Exception:

a) Only the air ducts according to 3.1.3 b, f and k may be penetrated by cylindrical components and/or cables. Provided that within the duct: the diameter of the component is no greater than 15mm at any point the cylinder central axis runs straight possible used tubes have no openings the distance between two components is at no point <50mm

b) It is explicitly allowed, that Support Device FD (EB20-079) may penetrate any duct in front of X=0.

If walls of a closed air duct are penetrated by components, the gap between the component and the air duct wall must not be more than 15 mm.

Only the cooling duct for the exhaust (3.1.3k) may be penetrated by EB20-Suspension parts. The size of the required openings may be designed in a way as to ensure clearance for the suspension parts for any permitted kinematic constellation.

No opening in an air duct may result in the flow of air outside of a closed air duct through the plane AR1 and/or AR2.

A closed air duct may be made out of several parts, provided that the interfaces are sealed. The sealing agent is free.

If not explicitly permitted air within the contour may not be accelerated by moving parts.

Exception:

Air movement due to the principle movement of EB components.

3.1.4 Air inlet opening of closed air ducts

No individual air inlet opening may be located behind the AR2 plane.

3.1.4a Temporary sealing of air inlet openings (blanking)

At all times during an event, it is permitted to temporarily close (blank) air inlet openings completely or partially provided that no parc fermé regulations are violated and the following requirements are met:

1. Blanking is only permitted on a virtual surface (blanking surface) which is to be homologated. The virtual homologated surfaces for blanking and for the installation of protective screens may be identical.
2. For each air inlet opening only one virtual blanking surface is permitted which must close the air inlet opening entirely and may at no point have a radius <math><500\text{mm}</math>.

Exception to (2):

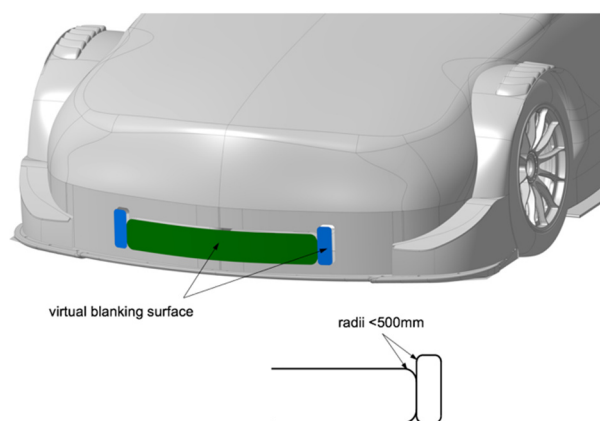
The contour of the surface visible in front view may have radio <math><500\text{mm}</math>

3. The material used for blanking may at no point be located further than 3mm away from the virtual blanking surface.

Exception to (3):

For the transition area between the virtual blanking surface and the homologated contour of the air inlet opening the following is valid: parts of the blanking material may be further away than 3mm from the blanking surface provided that no part of the relevant area is located further than 3mm away from the contour of the air inlet opening.

4. The material used for blanking must be homogenous and impermeable to air.
5. The following applies for the fixing material of the blanking: the surface licked by the air stream of parts of the fixing material may not be greater than 5cm^2 for each air inlet opening.
6. Blanking may solely have the purpose of regulating the air quantity flowing into the air ducts. It is at the discretion of the DMSB Technical Delegate to decide whether this point is respected or not.



Z88 – Example for permitted areas and contours of radii <math><500\text{mm}</math> on virtual blanking and/or protective screen surfaces

3.1.4 b Protective screens on/in air inlet openings

The installation of protective screens in front or within air inlet openings is permitted if the following specifications are met:

1. The installed protective screen must have (viewed in air flow direction) an open screening surface of at least 50%
2. The installation of protective screens is only permitted on a virtual surface (protective screening surface) which is to be homologated. The virtual homologated surfaces for blanking and for the installation of protective screens may be identical.
3. Protective screens must be homologated.
4. For each air inlet opening only one virtual screening surface is permitted which must close the air inlet opening entirely and may at no point have a radius <math><500\text{mm}</math>.

Exception to (4):

The contour of the surface visible in front view may have radius <math><500\text{mm}</math>

5. The separators must have a circular cross section with a diameter between 0.5 and 2mm.
6. The material used for screening may at no point be located further than 3mm away from the virtual screening surface.

Exception to (6):

For the transition area between the screening surface and the homologated contour of the air inlet opening the following is valid: parts of the screening material may be further away than 3mm from the screening surface provided that no part of the relevant area is located further than 3mm away from the contour of the air inlet opening. No open screening surface is defined in this area.

7. The following applies for the fixing material of the screening: the surface licked by the air stream of parts of the fixing material may not be greater than 5cm^2 for each air inlet opening.

3.1.4c Protective screens inside closed air ducts

The maximum of one protective screen is permitted for each closed air duct before its destination. The protective screen must have (viewed in the direction of flow) an open screening surface of at least 50%. The design of the open screening surface (distance and shape of the separators) must be identical over the whole surface. Any measure which leads to reduce or enlarge the distance between the separators is prohibited.

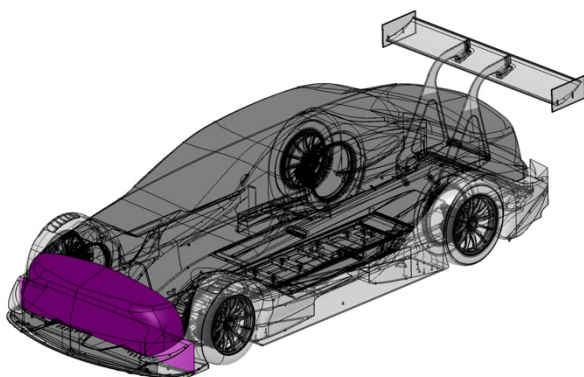
3.1.5 AR 1 plane

The vehicle must be designed so that no air stream which is not defined, and/or which is not located within a closed duct penetrates through the AR 1 plane which runs in parallel to plane VA at $x = -460\text{ mm}$ at no point within the below defined boundaries.

The AR 1 plane is limited as follows:

Above $z=275$ through the x-section of the scaled car.

Below $z=275$ through the area of the front diffuser (EB20-075 D+J) visible in bottom view and $y = 960\text{mm}$.



Z8 – Position and extent of the AR plane 1 (pink) at $x = -460\text{mm}$

3.1.6 AR 2 plane

The vehicle must be designed so that at no point within the below defined boundaries, the air stream penetrates through the AR 2 plane which runs in parallel to plane VA at $x = 2.300\text{ mm}$.

The AR 2 plane is limited as follows:

Above $z=275$ through the x-section (at $x=2.300\text{mm}$) of the scaled car.

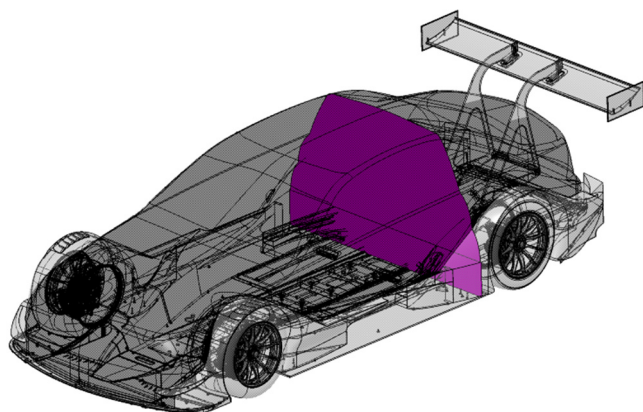
Below $z=275$ through the area of the underbody visible in bottom view and $y=955\text{mm}$.

Exceptions:

The closed ducts of the below (1. to 5.) defined air streams and diffuse air according to 6. and 7. may be passed through the AR 2 plane:

- 1) Cooling air for the rear brakes*
- 2) Gearbox oil cooling air*
- 3) Clutch cooling air*
- 4) Alternator cooling air*
- 5) Shift compressor cooling air*
- 6) Diffuse driver cooling air (if this occurs outside of an air duct and within the Cockpit and the air exits completely through openings in the rear window)
- 7) Diffuse propshaft cooling air

*provided that the air was guided entirely through EB20-112 D+J beforehand.



Z9 – Position and extent of the AR plane 2 (pink) at $x = 2.300\text{mm}$

3.1.7 Contour design

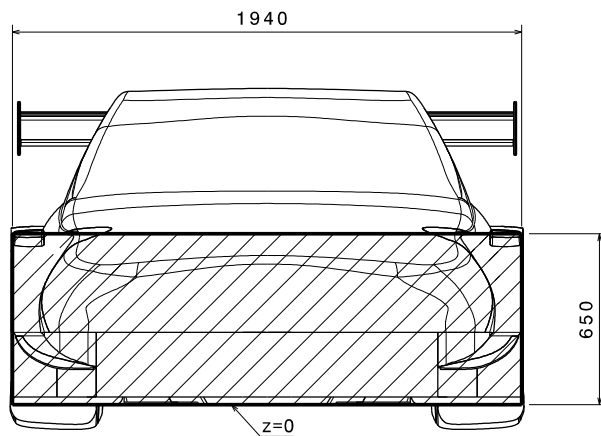
The contour must be designed so that in plan view no mechanical component is visible (windows are considered to be opaque for this purpose).

Exception:

The following parts may be visible in plan view:
Parts of the wheel which are located below $z=275$
Parts of the wheel if they are only visible through the openings of the louvres
The window wiper arm and the window wiper drive
Master switch
Fire extinguisher triggering system
Bonnet fasteners
The permitted protrusion of the exhaust tailpipe
Antennas used for radio-, TV- and marshalling data transmission

No component licked by the air stream may be transparent or translucent, with the exception of the homologated window surfaces, the lights and the contour in front of official camera lenses.

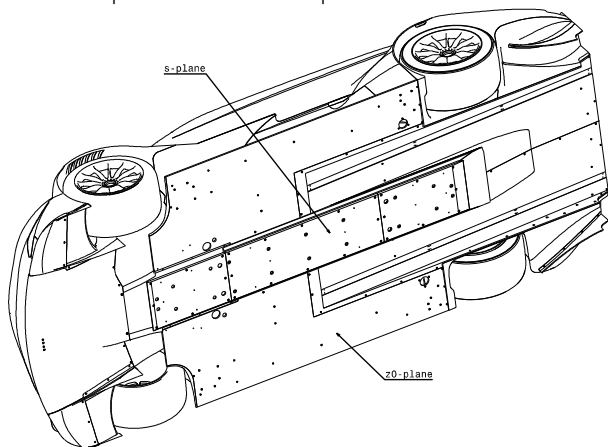
In front view of the race car and above $z=0$, a closed and rectangular area, positioned parallel to plane VA, of at least $1.940 \times 650 \text{ mm}$ must be covered.



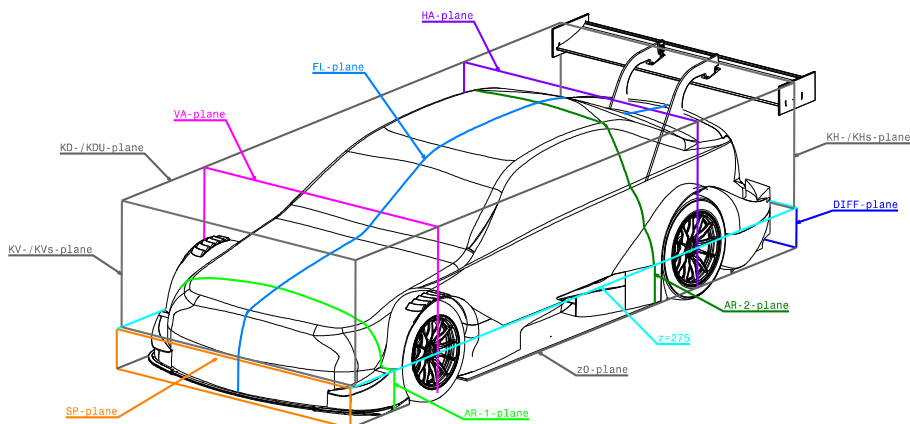
Z10 – Position of the mandatory closed area

3.2 Reference planes/coordinate system

The below planes and reference points are defined in the coordinate system:



Z11 – Position of the reference planes



Z11a – Position of the reference planes

The axes in the coordinate system run as follows:

- Y+ in driving direction, to the right from the vehicle longitudinal centre axis
- Y- in driving direction, to the left from the vehicle longitudinal centre axis
- X- to the front starting from x0
- X+ to the rear starting from x0
- Y dimensions indicated without prefix are applied to both sides respectively of plane Y=0.
- X dimensions indicated without prefix are applied behind (in driving direction) plane X=0/VA.
- Z dimensions indicated without prefix are located above z=0.

The following seven points (table 8), of which at least three are used as a reference during technical checks, are defined and marked on the monocoque (EB20-001 D+J) and represent binding reference points for $x=0$, $y=0$, $z=0$ and all other dimensions on the race car. It is at the discretion of the DMSB Technical Delegate to decide which three points are taken as reference.

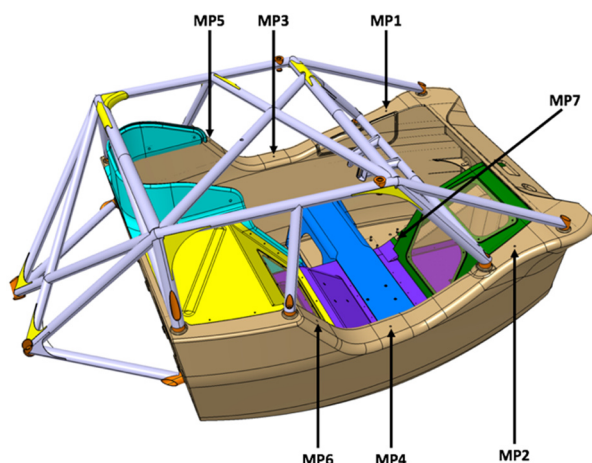
It is the responsibility of the competitors to deposit a measurement protocol at the DMSB. The coordinates of the measurement points defined in this measurement protocol are thereafter binding for the corresponding monocoque. The measurement protocol must:

- be deposited before the first of April at the DMSB
- be assigned unequivocally to a specific monocoque
- be issued and signed by the monocoque manufacturer

Monocoque reference points (MP):

	x	Y	z
MP1	828	-545	594
MP2	828	+545	594
MP3	1.385	-615	453
MP4	1.385	+615	453
MP5	1.682	-630	620
MP6	1.682	+630	620
MP7	1.015	-30	255

Table 8

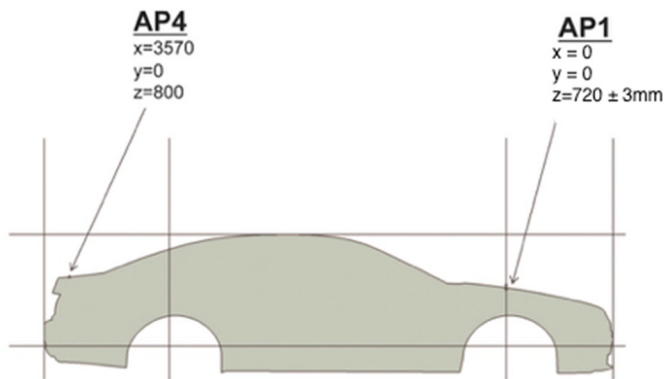


Z12 - Position of the monocoque reference points

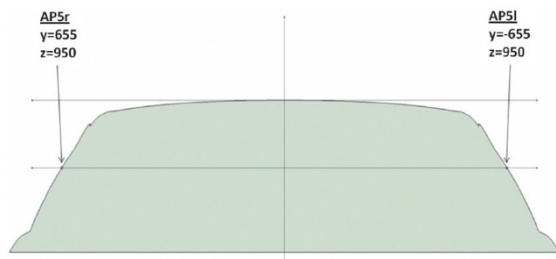
Aerodynamics reference points (AP).

	x	y	z
AP1	0	0	720 ±3mm
AP4	3.570	0	800
AP5 r		+655	950
AP5 l		-655	950
AP6	-650	0	560 ±15mm

Table 9



Z13 - Position aero reference points 1 and 4



Z13a - Position aero reference points 5r and 5l

The following reference planes are binding:

3.2a Plane z0

Runs at $z=0$ perpendicular to planes VA and FL.

3.2b Plane S ($z=-30$) Step

Runs on the race car at $z=-30$ mm in all points in parallel to plane z_0 .

3.2c Plane SP (Splitter front edge)

Runs on the race car between $z=0$ and $z=275$, at $x=-925$, in parallel to plane VA.

3.2d Plane KV (Front bodywork)

Runs on the series production car in parallel to plane VA through the foremost point of the bodywork in side view 875 mm below the plane KDU.

3.2d-e Plane KVs (Front bodywork, scaled)

Runs on the race car above $z=275$ at $x=-875$ in parallel to plane VA and is, in side view, in contact with the foremost point of the vehicle.

3.2e Plane VA (Front axle)

Runs on the race car at $x=0$ perpendicular to plane FL and vertically to plane z_0 through the centre axis of the front wheels.

3.2f Plane HA (Rear axle)

Runs on the race car at $x=2.750$ mm perpendicular to plane FL and vertically to plane z0.

3.2g Plane KH (Rear bodywork)

Runs on the series production car in parallel to plane VA, through the rearmost point of the bodywork in side view 875 mm below plane KDU.

3.2h Plane KHs (Rear bodywork, scaled)

Runs on the race car above $z=275$ mm at $x=3.775$ mm in parallel to plane VA and is, in side view, in contact with the rearmost point of the car (rear wings and rear wing supports, if existing, are ignored for the position of plane KHs).

3.2i Plane KDU (Bodywork top roof panel, unscaled)

Runs on the series production car through the uppermost point of the bodywork in side view.

3.2j Plane KD (Bodywork top roof panel)

Runs on the race car in parallel to plane z0 at $z = 1.150$ mm through the highest point of the bodywork. For vehicles for which the highest point of the bodywork is not located on the FL-plane the position of the plane KD will be defined by the DMSB.

3.2k Plane FL (Car longitudinal axis)

Runs at $y=0$ in X-direction through the centre section of the series production car and the race car (car longitudinal axis) and is vertically to plane z0.

3.2l Plane DIFF (Diffuser plane)

Runs on the race car at $X = 3.800$ in parallel to plane VA and is in contact with the rearmost point of the rear diffuser.

3.2m Plane 1 AR (Aero reference plane)

Runs on the race car above the area of the front diffuser visible in bottom view, at $x = -460$ in parallel to plane VA (see also 3.1.5)

3.2n Plane 2 AR (Aero reference plane)

Runs on the race car above the area of the underbody visible in bottom view, at $x=2.300$ mm in parallel to plane VA (see also 3.1.6).

3.3 Wheelbase

The mandatory wheelbase of the car is 2.750 mm ± 10 mm. The wheelbase may be checked at any time during an event on the vehicle standing on its wheels. The DMSB Technical Delegate alone decides when this check is to be carried out.

3.4 Vehicle width/track width

The maximum permitted width of the race car contour (without rear mirrors) is 1.950 mm. Tolerance: $+6$ mm.

Above $z=275$, no part of the EB rims may be outside $y=975$.

When checking the widths, those parts of the wheels below $z=275$ will not be considered.

The width may be checked at any time during an event on the vehicle standing on its wheels. The DMSB Technical Delegate alone decides when this check is to be carried out.

3.5 Contour dimensions, scaling and adjustment

In order to represent the various external dimensions required by these regulations on the race car, it may be necessary to scale the surfaces of the series production car in x, y and/or z.

All the areas of the bodywork must be scaled accordingly with a constant factor. It is not required that the factor for an X-scaling is identical to the factor for a -Z-scaling.

In order to represent the required dimensions through the scaling of the areas in accordance with the procedure specified below, it may become necessary to proceed with the scaling in several steps. In this case, the factor for each scaling must be recorded.

The software „Catia, Version V5“ is used for the control of the scaling.

The scaling factors as well as all the data required for a re-enactment of the scaling must be recorded on the homologation form of the race car. At least the y=0-section of the series production car as well as the scaling factors applied must be documented in the homologation papers.

Should the side projection of the bodywork deviate from the y0 section, the DTM KOMMISSION is to be informed before the scaling. If necessary, the DTM KOMMISSION can make binding scaling specifications which deviate from the following steps for the concerning vehicle.

After the scaling/adjustment, the contour must comply with the following conditions:

- It must be intersecting point AP1.
- It must be intersecting point AP4.
- It must be intersecting point AP6.
- Plane KVs must run at x=-875.
- Plane KHs must run at x=3.775 mm. This results in a distance of 4.650 mm between KVs and KHs.
- Plane KD must run at z=1.150 mm.
- It must, based on the frontal projection of the race car, intersect the points AP5 r and AP5 l or have a value at z=950 of $Y \geq 1.310$

Scaling for lights, door handles as well as manufacturer logos and type identifications is not a requirement; those parts may also be used on the race car without scaling.

3.5.1 Scaling procedure

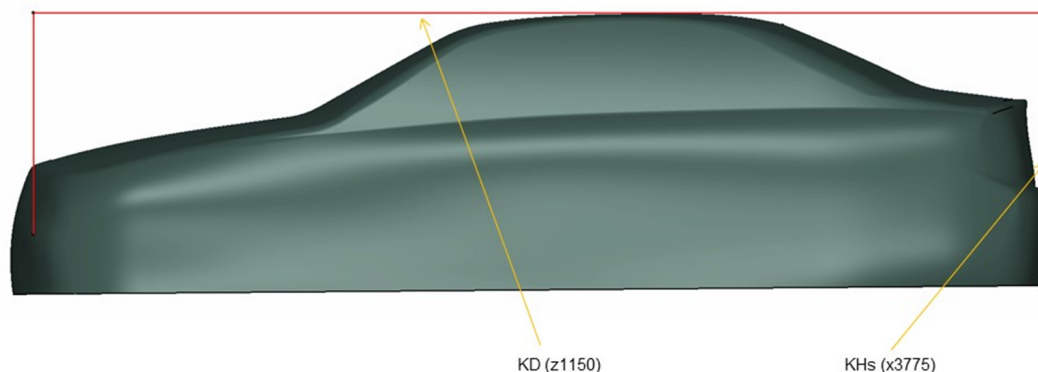
The following documented sequence of the scaling process must be complied with.

Starting position:

The y=0 section of the homologated series production vehicle in side view:

Step 1

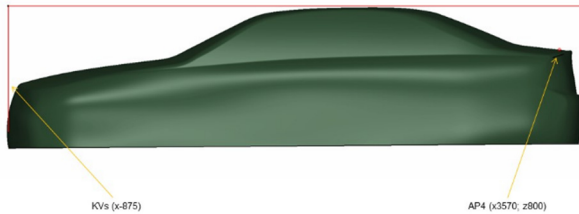
The bodywork of the series production car must be adjusted in such a way that the plane KD intersects the highest point at z=1.150 mm and that the plane KH intersects the rearmost point of the bodywork at x=3.775 mm, z=275.



Z14 – Step 1: Alignment of the y=0 section at the plane KD and plane KH

Step 2

If necessary scale bodywork so that the foremost point of the $y=0$ section intersects the plane KV at $x=-875$, $z=>275$ and AP4 at $x=3.570$ mm, $z=800$ mm

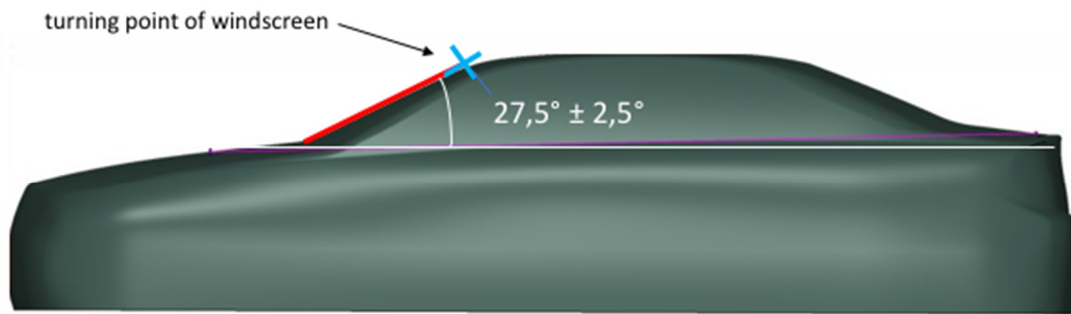


Z14a – Step 2: Scale contour, to match $Y = 0$ – section, KV5 ($z = -875$) and AP4

Step 2.1

If after Step 2 the angle of the windscreen along $Y = 0$ is different from $27,5^\circ (\pm 2,5^\circ)$ the windscreen must be turned (around highest point of windscreen at $Y=0$) in a way, that the angle comes to $27,5^\circ (\pm 2,5^\circ)$. The windscreen angle must be in the mentioned area even after step 8.

Any cap between bodywork and windscreen, resulting from the turning process, has to be closed by cutting or extending the windscreen and by keeping the original shape of the bodywork.



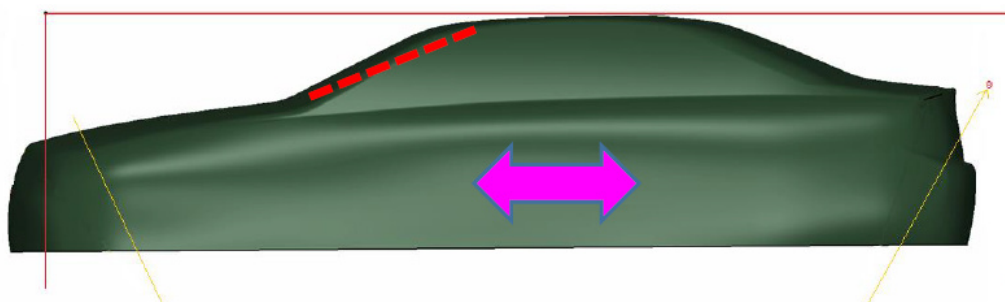
Z14b – Step 2.1 adjusting windscreen angle

If after Step 2.1 the roll cage is not completely covered by the bodywork the following steps 2.2 to 2.6 should be done:

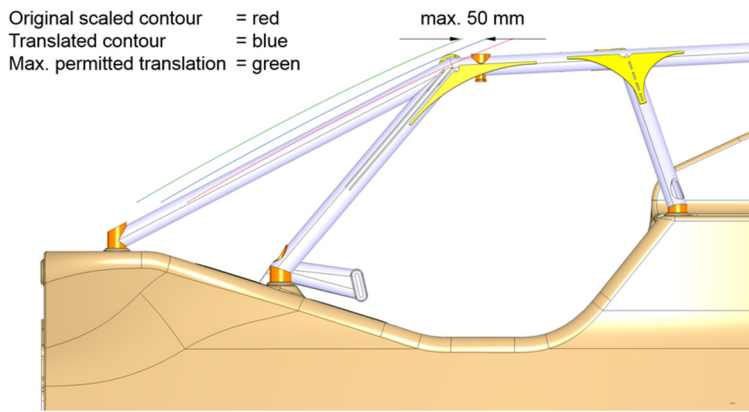
Step 2.2

Based on the contour after Step 2.1 (Example: red contour in drawing Z14), translate the scaled bodywork in X-direction until the roll cage is completely covered by the scaled contour for the first time (blue contour). From this position the bodywork may be translated an additional distance of no more than 50mm, provided that the roll cage remains completely covered (green contour).

If the overall distance of translation needed to cover the complete roll cage is greater than 250mm (from the red contour to the green contour), a special permission from the DTM commission is required.



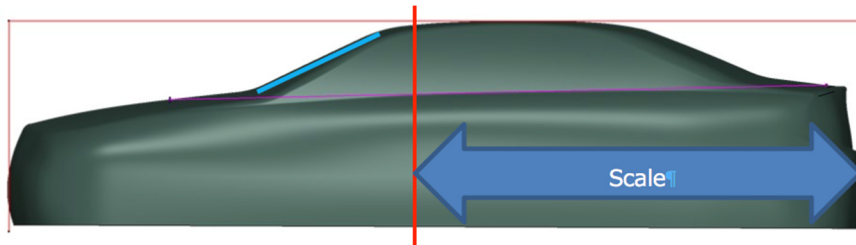
Z14c – Step 2.2 Moving bodywork to cover foremost tube of roll cage



Z14c.1 – translation of scaled bodywork in order to get roll cage tubes covered

Step 2.3

Cut the bodywork by a virtual plane that runs 100 mm behind the rearmost edge of the windscreen in parallel to VA-plane.



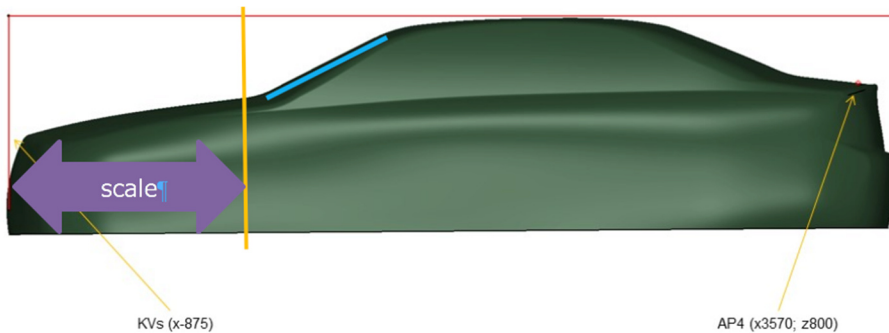
Z14d– Step 2.3 + 2.4 Cutting and scaling of bodywork to cover rearmost point of bodywork

Step 2.4

Scale the bodywork behind the virtual plane until the rearmost tube of roll cage is covered by the bodywork and rearmost point of bodywork matches X = 3775 mm

Step 2.5

Cut bodywork by a virtual plane that runs at x = 630 mm in parallel to VA-plane.



Z14e– Step 2.5 + 2.6 Cutting and scaling front of bodywork to match x = 875

Step 2.6

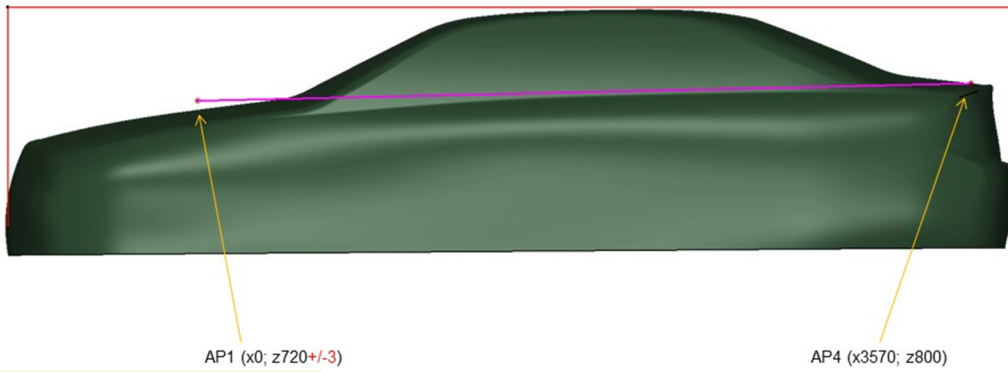
Scale the bodywork in front of the virtual plane until foremost point of bodywork matches x=875 after.

Step 2.7

Put together the 3 parts of the bodywork. It is expressly allowed to harmonize the transition areas between the 3 parts. Any such harmonization must be agreed by the DTM Kommission.

Step 3

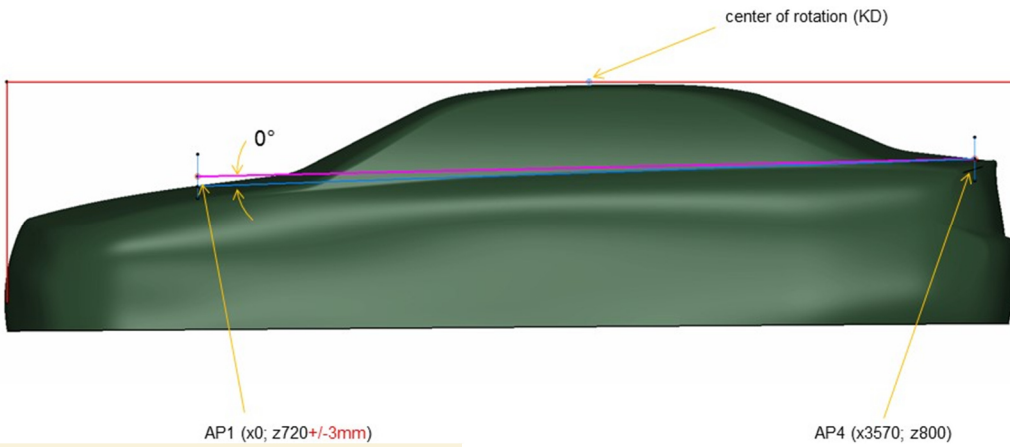
Set tangent from AP1 (x = 0mm, z = 720 ± 3mm) to AP 4 (x = 3.570 mm, z = 800mm).



Z14f– Step 3 Set tangent from AP1 to AP4

Step 4

If necessary, rotate bodywork/ $y=0$ section around the highest point of the bodywork until the $y=0$ section intersects points AP1 and AP4.



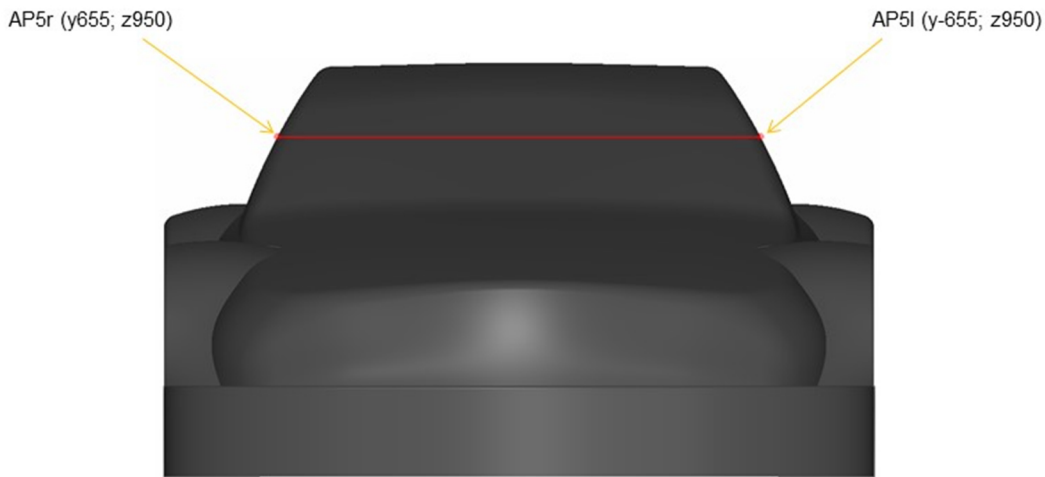
Z14g– Step 4 rotation of bodywork to match AP1 and AP4

Step 5

If necessary repeat step 1, step 2, step 3 and step 4 (do not repeat step 2.1 to 2.6) until the required intersection points are achieved.

Step 6

The bodywork must be scaled in such a way that the points AP5r ($y=655\text{mm}$, $z=950\text{mm}$) and AP5l ($y=-655\text{mm}$, $z=950\text{mm}$) are intersected by the projections derived from the front and back view. Step 6 is only mandatory if the width of the bodywork at $z=950$ is different from 1.310 mm.



Z14h– Step 6 Scaling of greenhouse to match AP5 r and l

Step 7

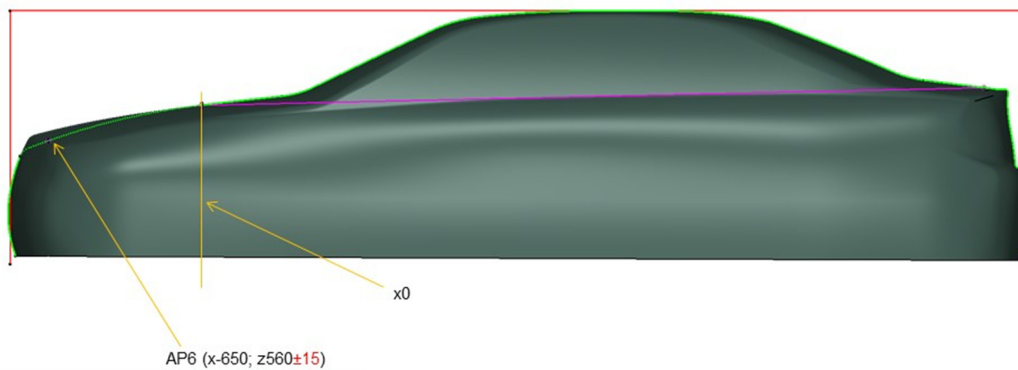
Should the $y=0$ section not intersect the point AP6 ($x= -650\text{mm}$, $z= 560\pm 15\text{mm}$) after step 6 within the tolerances the bodywork must be locally modified in front of $x=0$ accordingly. Whereby:

If the $y=0$ section runs initially above AP6 at $z > 575\text{mm}$ the $y=0$ section must intersect AP6 between $z=572$ and $z=575$ after the modification.

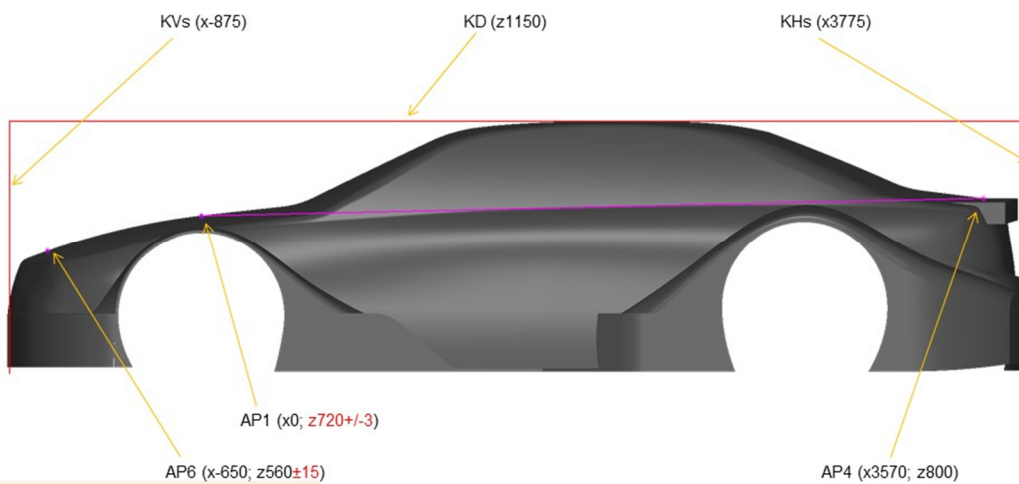
If the $y=0$ section runs initially below AP6 at $z < 575\text{mm}$ the $y=0$ section must intersect AP6 between $z=545$ and $z=548$ after the modification.

In any case all local modifications must respect the appearance and aesthetic of the original contour. The assessment if this requirement is met is at the discretion of the DMSB Technical Delegate.

If the $y=0$ section after step 6 intersects "AP6" within the tolerances ($x= -650\text{mm}$, $z= 560\pm 15\text{mm}$) the bodywork may not be modified in front of $x=0$.



Z14i- Step 7 Contour before step 7 (example)



Z14k-Y=0 section after step 7 (example)

Step 8

The final scaled contour must be homologated.

The complete 3D CAD data of the unmodified series production car as well as the 3D CAD data of the scaled vehicle must be submitted to the DMSB together with the homologation application form. It must be possible to identify amongst others the possibly modified design attitude from the data.

The data submitted shall serve as reference for checking the mandatory contour characteristics and the contour inclination angle.

Vehicles which, even after the completion of steps 1 to 7, do still not comply with all the requirements as stipulated in these regulations may possibly be homologated on the basis of a special admission. The DTM KOMMISSION alone is entitled to approve a request for a special admission. It is the responsibility of the applicant to submit the DTM KOMMISSION all the requested data and information about the vehicle in question. The approval of a special admission may be subject to respecting technical conditions, which may differ from the provisions and freedom, granted in these regulations.

If after the scaling process was completed the lower edge of the doors or the side panels (between X=720 and X= 1985) are partly or completely inside Y= 855, the bodywork must be modified in a way, that all points of the lower edges touching the closing plate (SB20-023) outside Y= 860.

In any case all local modifications done to follow that regulation must be done below Z = 600 between X = 200/X= 2.500 and have to respect the appearance and aesthetic of the original contour as much as possible. The assessment if this requirement is met is at the discretion of the DMSB Technical Delegate.

3.6 Attachment of components

a) Any part of the car, which is licked by the air stream, must at all times during the event and whilst the car is in motion be rigidly secured to the monocoque of the car without any freedom of movement.

All of these parts may not have any freedom of movement in themselves and/or in relation to the monocoque, with the exception of EB suspension components and of the propulsion.

Under no circumstances may a part of the contour change its position or shape whilst the car is in motion.

Exception to a):

- 1) Closed air ducts (or parts thereof) for the cooling of the front brakes which are made out of tubing material may move in accordance with the kinematics of the front wheels.
- 2) Closed air ducts (or parts thereof) for the cooling of the rear brakes which are made out of tubing material may move in accordance with the kinematics of the rear wheels.
- 3) The rear wing can rotate about its axis of rotation (defined in drawing 29) as defined in the sporting regulations 2019 through the activation/deactivation of the DRS function.
- 4) The brake ducts (EB17-091 and EB17-092) must move together with the wheel uprights without any relative motion.

a) Doors, windows, front bonnet and boot lid must be completely closed according to their position on the series production car and be located at their standard positions when the car is in motion.

The front bonnet and the boot lid must be fitted with at least two safety fasteners each, clearly identified by means of a colour in clear contrast to the rest of the vehicle.

It must be possible to open the front bonnet and the boot lid without using tools or other aids.

Original fuel filler flaps may be removed. The resulting apertures in the contour must be closed in a way that the contour thereafter runs mirror-symmetrical to the comparable surface on the opposite side of the vehicle.

The bridging of gaps through adhesive film, decorative film and/or lacquer foil is prohibited for all areas of the vehicle above the design line which can be licked by the air stream.

Exception with regards to gap bridging:

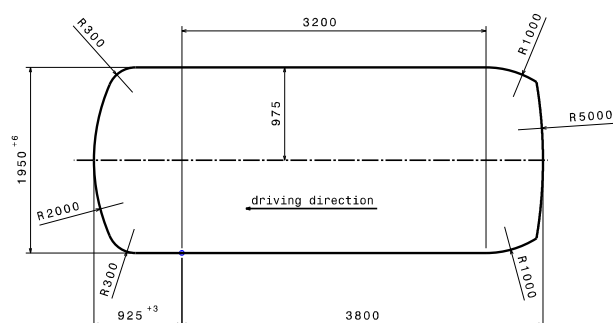
see Article 3.10

3.7 Maximum contour

In plan view, no part of the race car must protrude beyond the maximum contour as represented in the drawing (Z15) below.

Exceptions:

- The rear wing (EB20-023 D+J) and parts of the rear wing support struts and the rear wing end plates
- Parts of the front diffuser (EB20-075 D+J)
- The front flick (EB20-105)
- Rear diffuser (EB20-078 D+J)
- Wheels below z=275.
- Outside mirrors



Z15 – Maximum contour of the vehicle in plan view (without exterior mirrors)

3.8 Bodywork design above the design line

All areas of the race car which may be licked by the air stream when doors and windows are closed, and which are situated above the design line must have identical contour characteristics in accordance with the 3D CAD data set submitted for the scaled vehicle.

The 3D CAD data set of scaled contours may differ from the also submitted data set of the unscaled contour only with regard to factors which result exclusively from the permitted scaling, shifting and/or rotating.

Exceptions (permitted deviations from the scaled contour):

A1 License plate brackets or supports for registration plates which are located within $y=325$ mm as well as between the design line and $z=425$ mm may be removed. Holes which possibly result must be closed, adapted to the ambient contour, and be arranged in an appealing way.

A2 At any position behind $x=0$ mm, a local modification of the contour is permitted at one point, provided that this modification is limited to a maximum diameter of 120 mm and has the sole purpose of attaching the connecting valve for the external air feed of the pneumatic jacks. This modification is permitted symmetrically identical on both sides of the vehicle (with regard to the $Y=0$ plane) and can be optionally used solely for the attachment of the connecting valve. The respective position which is not in use must be closed in such a way with a cover so that the scaled contour is restored.

A3 There must be 2 holes with a diameter of 34 mm (+/- 1mm) in the roof panel to give access to the jacking points (see Article 14.5).

A4 The front bonnet must be modified in accordance with Article 3.12.1 (cooler exhaust air openings).

A5 The design of the area between the front bonnets rear edges and the windscreen (water box) is free, provided that no mechanical component is visible neither in front nor in plan view, with the exception of the windscreen wiper (including its drive), the fire extinguisher triggering, the bonnet safety fasteners and the main switch. No part of the water box must be visible in front view.

A6 For areas/surfaces of the race car contour which are in contact with the mandatory spoiler lip and the defined transition area, the contour of the rear spoiler in accordance with the 3D CAD data set (see 3.15.1) is compulsory.

A7 Eight local modifications (4 in front of $x=1.100$, 4 behind $x=2.200$) in the contour are permitted for the fitting of a maximum of 4 fasteners in front of $x= 1.100$ and a maximum of 4 fasteners behind $x=2.200$, provided that each single modification is limited to an area that can be covered by a rectangle of 60 x 160 mm. The minimum distance between two modifications of the contour is 200 mm. The modifications shall at no point be outside the scaled contour.

A8 both exterior mirrors

A9 Additional permitted separation lines

A10The two apertures for the passage of the rear wing support struts

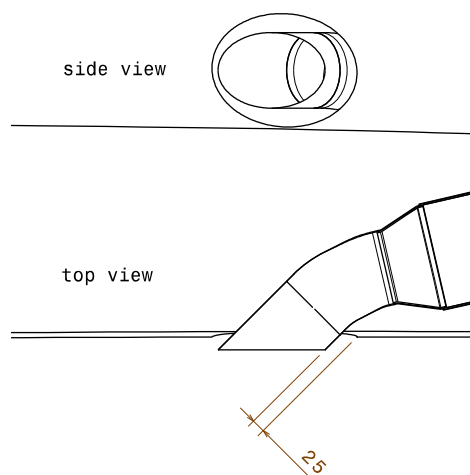
A11The permitted modifications for the mounting of the quick filler valves

A12The separation line of the mandatory roof hatch

A13The permitted apertures in the rear window

A14Local modifications of the scaled contour in the vicinity of the design line are permitted, but only after approval of the DTM KOMMISSION and after agreement of all manufacturers organised within the DTM KOMMISSION. The DTM KOMMISSION will in all cases only approve modifications which unequivocally do not take any significant effect on the aerodynamic properties of the car and which are limited to the adjustment to the ambient contour.

A15It is permitted to apply one aperture on the right side of the vehicle for the passage of the exhaust outlet port. The maximum dimension of this port results from an offset of 25 mm with regard to the interior surface of the exhaust tailpipe aligned at an angle of 45 degrees with regard to plane FL. The last 50 mm of the tailpipe are relevant for the size of the opening (see 5.9.1).



Z79 – Exhaust outlet port

A16 It is permitted to set a hole (max diameter 30mm) into the rear bonnet in order to install LB20-030 Rear view camera.

It is permitted to cover the surfaces licked by the air stream within the area specified in table 9 below with a flame/heat protection, provided that the flame/heat protection does not have an offset of more than 2mm to the scaled contour at any point.

x	x	z	z
1.600	2.500	275	450

Table 9

For attaching the heat protection, it is permitted to apply the maximum of 4 circular, maximum 4 mm deep recesses deviating from the scaled contour with a diameter of <15mm within the limited area.

3.9 Areas behind x=2.300

Parts of the race car which are located behind x=2.300 mm and which are not visible in plan view (for the interpretation of these regulations, contour areas of the scaled vehicle which in plan view form an undercut, the spoiler lip, the rear wing including supports and the end plates are considered to be transparent, windows are considered to be non-transparent) may only be licked by diffuse air stream when doors and windows are closed.

Exceptions to 3.9:

Parts of the drive shafts which protrude into the rear wheel arch*,
 Suspension parts (EB20-052/053) which protrude into the rear wheel arch*,
 Parts of the brake system which protrude into the rear wheel arch*,
 Parts of the brake duct (EB20-091/092)*,
 The gearbox oil cooler (LB20-014),
 Inner surfaces of air ducts of defined air (see Article 3.1.2 and 3.1.3),
 Points which must be visible in bottom view,
 Points of EB20 and SB20 components which are not visible in plan view,
 Local recesses for safety fasteners,
 Areas of separation lines which are not visible in plan view.
 Rear view camera LB20-030

*the referred parts are located below the design line

3.9.1 Openings in the contour

If the scaled contour offers less than 56.000 mm² (less than 46.000mm² when SB20-030 NACA duct is used) of air intakes above z 275 and in front of x – 750 existing openings may be extended, or new openings may be created.

The following conditions must be respected:

All parts/areas of the extension or new created openings must lay within

x	y	z
In front of -650	395	275 to 455

The total area of openings in the prescribed area may not exceed 56.000 mm² (46.000mm²). All openings must be connected to closed ducts in a way, that no air can get into the contour outside of a duct.

If the scaled contour offers more than 56.000 mm² (46.000mm² when SB20-030 NACA duct is used) of air intakes above z 275 and in front of x -750 existing openings must partly be closed (immediately behind the standard moulded parts -grille, slats etc- which are located inside the cooler opening) until max 56.000 mm² (46.000 mm²) of openings remain. All remaining openings must be connected to closed ducts in a way, that no air can get into the contour outside of a duct.

All other openings in the contour above the design line must be closed in following the direct ambient contour in a logical manner.

Exceptions:

In the area between the trailing edge of the front bonnet and the windscreen (water box), openings are permitted, provided that no mechanical components are visible in plan view, with the exception of the windscreen wiper arm and drive.
The cooler/intercooler exhaust air openings in the front bonnet.
Openings for closed air ducts are permitted within the area of standard cooling air inlets.
Openings according to 3.9 A15 and according to 3.11.3.

Air intake openings which are located inside the standard cooling air inlets (radiator grille) behind the standard moulding of the radiator grille may have areas which are not visible in plan view.

3.10 Separation lines

All standard separation lines (separations with which components of the series production car which make up the contour can be dismantled non-destructively) of the contour (above the design line) must be preserved up to minimum 3mm in depth. The gap size of the separation lines must correspond to those of the series production car.
The separation lines of the front doors must in any case be preserved completely and functionally identical.

Provided that the exhaust outlet ports are situated above z=275 and the separation lines of the front doors of the scaled car run through the area defined in table 9, it is permitted to freely modify the course of the separation lines of the right-hand side front door, provided that the scaled contour remains unmodified except for the relocation of the separation line.

It is permitted to create any additional separation lines above the design line and bridge the resulting gaps, provided that the scaled contour remains unchanged.

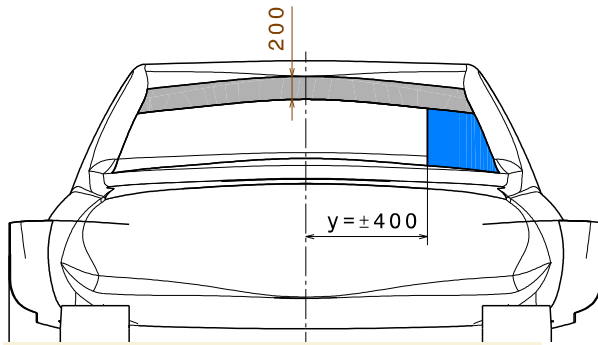
3.11 Windows

The windows must not be designed as hollow parts.
All the window surfaces licked by the air stream on the scaled vehicle must remain at their original position on the race car and have identical (corresponding to the CAD data set submitted) exterior shape and dimension and must be transparent.

Exceptions:

- 1) For the installation of the EB component EB20-043 J (quick refuel valve unit), the contour of the rear scaled windows (left and right side) of the car must may be modified so that the quick refuel valve unit (EB20-043 J) may be fitted at any time without any additional modification of the contour. The modifications of the contour must be strictly limited to the absolutely necessary dimension and be located within a block with the edge lengths of 350 x 200 x 250 (x, y, z).
For events where refuelling under racing conditions is prohibited, it is permitted to provide the area of the scaled contour that may be affected by possible modifications with a corresponding cover of the unmodified contour of the scaled vehicle.
- 2) The windscreen may be cut 10 mm below the curve which, in front view, results from the projection of the front bonnet rear edge. The windscreen must be fitted with an electric window heating.
- 3) To extract the driver cooling air, it is permitted to apply apertures in the rear window. Only air that has previously been fed through the driver cooling air ducts into the Cockpit and/or the service box may be extracted. The apertures must be located completely within the area marked in blue in drawing Z16. The area marked in grey in drawing Z16 results from an offset of 200mm of the upper window edge onto the contour of the window. The area marked in blue in drawing Z16 is valid symmetrically identical on both sides of the vehicle and is limited by the above-mentioned offset of the upper window edge, the window section of the scaled contour and a plane running at y=400 parallel to the y=0 plane.

4) Windows located behind the bulkhead (see 13.8) must not be transparent.



Z16 – Eligible area for openings to extract the driver cooling air

Number and shape of the apertures are free. The apertures may at no time during an event be less than the total of 10.000mm² or bigger than the total of 30.000mm².

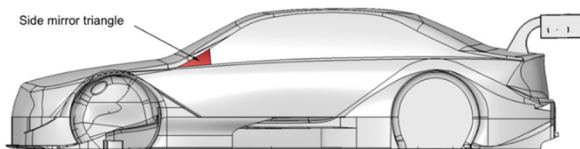
Design, dimension and location of the apertures form part of the homologation.

If it is not possible to place apertures as big as 30.000mm² in the above defined area, it is allowed to extend the area by replacing the plane running at Y=400 to Y = 350. If even then it is not possible to place apertures as big as 30.000mm² inside the extended area, the plane running at Y=350 may be replaced to Y= 300.

No component which is in rear view visible through the apertures may be closer than 40mm to the inner contour of the rear window.

If the use of an air condition system is allowed by sporting regulations, it is permitted to apply additional apertures in the rear window in order to introduce the cooling air for air conditioner condenser which is defined by article 3.1.3 q).

4) It is permitted to design the non-transparent areas for the fixation of the exterior mirrors on the scaled vehicle, if existing, in the front area of the front door windows (side mirror triangle) as transparent single piece together with the door window.



Z17 – Position side mirror triangle

5) A possible tinting of transparent windows must have a minimum luminous transmission index of 75 percent. In any case the driver sitting inside the car must be visible at a distance of 5 meters.

Exception for 4 door vehicles:

If the front doors are lengthened in compliance with Article 3.13.1, the x dimension of the windows affected by the lengthening must change according to the x dimension of the lengthening. All the exterior points of the windows resulting from this lengthening must be licked by the air stream.

All windows located in front of the bulkhead (see 13.8) must be homogeneously made out of hard coated polycarbonate.

The following minimum thickness must be respected by all windows made from polycarbonate.

- Windscreen: 5,8 mm
- Rear window: 3,8 mm
- Side windows: 2,8 mm

If any window is (in conformity with this technical regulations) made from different material than polycarbonate, the overall weight of that window must be identical to a window made from polycarbonate. Furthermore, the centre of gravity of the mounted window must be at the same level like it would be when using a polycarbonate made window.

The mounting principle is free.

For vehicles with frameless door windows it is permitted to reinforce the circumferential edge of the frameless window on the inside of the window. This reinforcement must follow the contour of the window and must not protrude by more than 35 mm into the window surface visible from the outside in side view. The polycarbonate door window must be in place underneath the reinforcement visible in side view from the outside and it must comply with the mandatory material thickness (2,8 mm) and design. The dimensions of the standard or scaled door windows with regard to their length and height may in no case be reduced as a result of this modification. The maximum permitted thickness of the door windows in the area of possible reinforcements, together with the reinforcements, is 40 mm.

It is permitted to design the rear door windows and triangle windows, if existing, as a single-piece. If the standard separation line runs between the rear door window and the triangle window, it is permitted to represent the separation line only visually.

Mirror-coating of the windows is prohibited. A 200 mm high, lightproof sun strip on the polycarbonate, over the total width of the windscreen and starting from the upper edge of the windscreen and measured along the contour, is authorized.

The use of safety film on the windscreen is permitted, on condition that the minimum luminous transmission index does not fall below 75 percent.

Only the lettering according to the sporting regulations and the position display (EB20-090) are permitted on the windows of the vehicles.

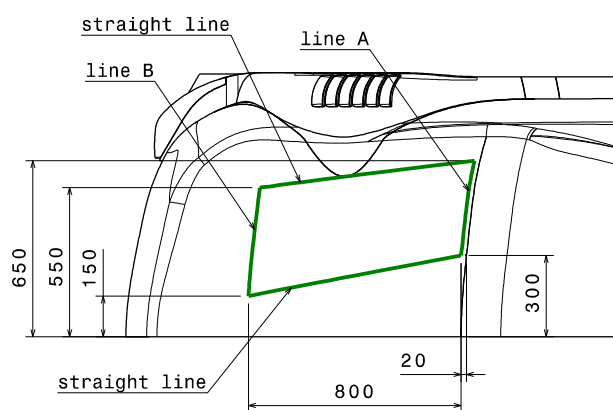
3.12 Opening radiator ventilation

There must be an opening for the extraction of the radiator ventilation and the intercooler ventilation on either side of the front bonnet. The openings must be located on both sides in an area which is limited by the 4 Lines shown in drawing Z18:

It is permitted to modify the opening edges within a 20mm wide strip by the maximum of 10mm in positive z-direction with regard to the contour of the scaled vehicle, on condition that the complete modifications of the contour are located within the area defined in this article for the radiator and intercooler ventilation openings.

With the exception of the air ducts channel that follows the openings, no other component must in plan view be visible in the radiator and intercooler ventilation openings.

No part must in top view be visible that splits the air flow inside the duct or inside the opening at any point.



Z18 – Eligible area for the radiator ventilation opening on the front bonnet

3.13 Doors/door hinges

The pivot of the doors must run vertically to plane z0 (tolerance: 10 degree).

It is permitted to integrate the rear doors of four-door vehicles solidly into the bodywork, on condition that the separation lines are retained up to a depth of 3mm.

The door hinges of the front doors must be designed so that it is possible to remove the complete doors manually without using tools.

Door hinges may only be used as pivots for the doors and must not assume any other function.

3.13.1 Door lengthening

The front doors of 4-door vehicles may be lengthened in x-direction by the maximum of 100 mm towards the rear, on condition that the contour of the vehicle, with the exception of the modifications absolutely necessary for the door lengthening, is not modified. For 4-door vehicles, the rear doors may be shortened by the actual dimension of the door lengthening. In no case must the modifications of the doors result in a modification of the contour.

The eligible modifications must not result in a modification of the total area of the side windows licked by the air stream with regard to the corresponding area on the homologated series production car.

Neither the single modifications nor the entirety of the modifications must result in any other function than the one intended (lengthening of the doors). It is at the discretion of the DMSB technical delegates to approve or not the eligibility of the above modifications.

The modifications must be indicated in the 3D CAD data set submitted to the DMSB.

3.14 Bumpers

It is permitted to modify the contour of the bumper locally to create the advertising space specified in Article 3.21.6, on condition that the modification is strictly restricted to the creation of the minimum surfaces required for design, location and dimension.

3.15 Boot lid/spoiler lip

For the passage of the rear wing support struts, it is permitted to create two slots, open towards the rear window, in the boot lid. These slots may reach no further than up to $x=3.570$ mm. The width of the distance between the side edges of these slots must not be more than 50 mm from each other.

The width of the slots must at no point be greater than 25 mm, when the boot lid is fitted to the car.

It is permitted to partly or totally close the slots with inserts and/or adhesive tape which must follow the scaled contour.

3.15.1 Transition of the spoiler lip

The "spoiler lip" (SB20-004) will be available as CAD data set on the platform and must be attached to the boot lid as specified in the drawing below.

The centre point of the radii indicated ($R=3.000$ and $R=10.000$) is located on plane FL.

The upper side of the spoiler lip represented in the data set must be completely visible in plan view (without rear wing and rear wing support).

For the purpose of an individual design of the transition of the spoiler lip into the scaled standard contour, an area below the spoiler lip shall be available which is limited by an offset of the spoiler lip rear edge by 100 mm parallel to the negative z-direction.

The design of the transition is not subject to any restrictions, on condition that no areas/surfaces of the transition are visible in plan view (without rear wing and rear wing support), with the exception of the eligible transition radii, and on condition that the transition areas or transition contours are running tangentially to the compulsory radii of the standard surface.

The eligible transition radius between the spoiler lip and the scaled standard contour is 5 mm.

It is permitted to chamfer the edges of the spoiler lip which are not in contact with the contour with a maximum radius of 5 mm.

In the case that parts of the scaled vehicle penetrate into the spoiler lip when fitted according to the regulations, the protruding parts of the standard contour must be removed.

In any case, the fitted spoiler lip including all transition areas/ contours must be submitted to the DMSB Technical Delegate with a sufficient advance so that modifications can be performed upon the request of the DMSB Technical Delegate in time before the homologation.

The modifications of the standard contour as well as the position of the spoiler lip and the design of the transition areas/ contours must be recorded in form of CAD data sets. These CAD data sets form part of the homologation of the race car.

3.16 Rear wing

The rear wing (EB20-023 D+J) has areas which are not visible in plan view.

All components of the rear wing (EB20-023 D+J) must at all times during an event be mounted in the mandatory manner and position.

It is permitted to use the openings of the rear wing supports (EB20-028 D+J) marked in the drawings (Z28) below for the individual attachment of components.

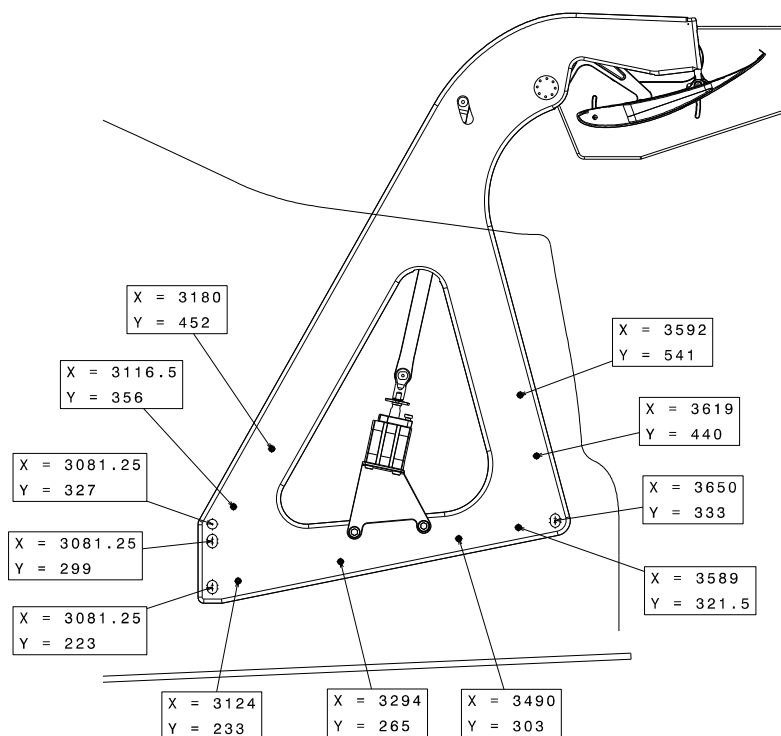
It is permitted to cover the wing supports in the transition area rear wing support/boot lid with a maximum 40 mm high (z) and 1 mm thick protective material.

It is permitted to cover the support in the transition area rear wing support/boot lid with a maximum 40mm high (z) and 1mm thick protective material.

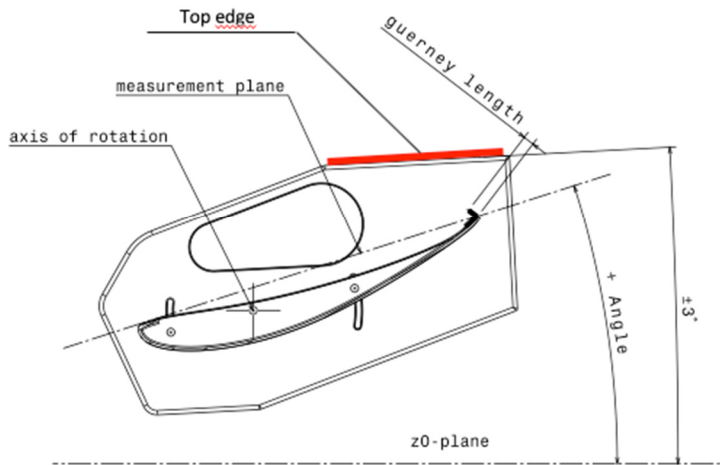
The rear wing profile may at any time during an event be individually rotated and fixed by -5 to 20 degrees (with reference to plane z0) in each position (setup position) around the mandatory rotation axis defined in drawing Z29, while the car is not driving. The angle of the wing profile is hereby defined by the position of the measurement plane which, in x- and y-direction, runs through the two highest points of the wing profile (see drawing Z29). In the case of an adjustment with an angle of more than 0 degrees, the rear profile edge must be higher in z than the front edge.

Exception:

When DRS-System is activated, the rear wing profile may – in accordance with the sporting regulations – be rotated and fixed while the car is driving. The permissible rotating range may become different.



Z28 – Openings in the rear wing support which may be used for individual connections



Z29 – Position of the measuring plane for the determination of the wing angle, the rotation axis and gurney length

The wing profile must be equipped on both sides with end plate of EB components.

With the DRS deactivated and the rear wing in the setup position, the top edge of the rear wing end plates (see red line in drawing Z29) must be parallel to the Z0 plane. (tolerance = ± 3 degrees)

With the exception of the wing profile (EB20-023 D+J), the wing support (EB20-028 D+J) and the end plates, no other part may be above $z = 900$, behind $x = 3.500$.

No components or brackets may be attached to the endplates.

The following applies for the deformation of the rear wing:

The rear wing mounted completely to the vehicle may deflect no more than 8mm vertically when a load of 1.500N is applied vertically and downwards.

The maximum permitted deflection with a rearward applied load of 600N is 5mm in the direction of the applied load.

The test shall be carried out as follows:

Measurement in Z

An initial load of 100N in form of a 1.350 mm long moulding which follows the wing contour is applied between the rear wing end plates. A load of 1.400N is then applied to the moulding. The deflection of the rear wing will be checked at the upper edges of the end plates.

Measurement in X

The wing profile is positioned so that the measuring plane runs in parallel to plane z0. A load of 300 N (in total 600N) is then applied at the profile front edge, at the level of each rear wing support respectively, in parallel to plane z0 and in positive X-direction.

The deflection of the rear wing will be checked at the two front edges of the end plates.

3.16.1 DRS

The complete DRS is a standard component (EB20-028)

Solely through the use of the DRS standard components in compliance with the regulations may the position of the rear wing be modified whilst the car is in motion.

Any other means or device which enables the modification of the wing position whilst the car is in motion is prohibited.

When activating the DRS the position of the measuring plane used to determine the wings angle of attack must not be reduced by more than 18 degree.

Under no conditions the angle of the measurement plane (in reference to plane z0) may be less than -8° .

One of the EB20-028.09 parts must be mounted.

The use of the system, as well as the use of "DRS-Blocker" (EB20-028.04.09) is bindingly governed in the DTM Sporting Regulations.

3.17 Roof hatch

In an area which is limited by

x	x	y	y
1.700	2.130	0	440

Table 10

there must be a rectangular volume with lateral extensions of at least 420 x 420 mm above the driver's helmet and below the roof outer panel. No part of the car must be within this volume, with the exception of a possible protective padding on the rollover structure.

3.17a a roof panel

It must be possible to open the roof panel above the volume specified under 3.20. The opening must be rectangular and have an edge length of at least 420 x 420 mm (tolerance ± 5 mm). It is permitted to round off the corners of the opening with a maximum radius of 80 mm.

3.17b quick release fastener

The opening must be closed with a cover.

The cover must be fixed with four quick-release fasteners (LB20-004). It must be possible to operate these quick-release fasteners from the outside of the vehicle.

The separation lines resulting from the cover must have a maximum clearance of 2 mm and the gaps must not be bridged by decorative strips.

The homologated contour must not be modified through the cover and the modifications must not have any aerodynamic effect.

Sunroofs on the race car are prohibited.

3.18 Lighting

All components of the outside lighting form part of the homologated contour. It is permitted to use the unscaled contour of the lighting elements (cover glass). In this case, it is permitted to cut the original contour of the lighting elements, on condition that the only purpose is to adapt the contour of the lighting element to the scaled openings in the bodywork.

In all cases, all lighting elements must be in working order throughout the entire duration of the event. All the transparent surfaces of the headlamps of the homologated series production car must also be transparent on the race car.

Exception:

For parts of lighting assemblies which are located below the design line the design guidelines of the respective area apply.

3.19 Exterior and interior mirrors

An interior mirror which enables a view to the rear must be present.

Alternatively, cars must be equipped with a rear view camera and the associated monitor LB20-030

The race car must have one (1) exterior mirror (EB20-077) on each side which is, including all brackets and adjustment mechanism, located entirely inside the mirror box defined below in table 75 but outside the scaled contour.

With the exception of the exterior mirror and the mirror stalk no part may be located inside the mirror box (only applicable to parts of the mirror box located outside the scaled contour). There may be points inside the mirror box which are licked by the air stream but which are not visible in plan view.

Dimension and position of the mirror boxes

x	x	y	z	z
650	1.150	975	560	900

Table 75

The position (x, y, z) of the completely installed mirror housing can be moved individually in x, y, and/or z if all points of the mirror housing are moved by the same coordinates regardless of the position of the CAD model filed on the DMSB server.

The following provisions apply for the mirror stalks (connecting element between mirror housing EB20-077 and vehicle contour):

It must be located entirely inside the mirror stalk box (SB20-031) defined in drawing Z113 and filed on the DMSB server.

Its position in relation to the contour and mirror will be homologated

It may not form a closed air duct

All components necessary for its attachment to the exterior mirror must be located inside area A (see drawing Z112 and specification sheet exterior mirror)

With the installed mirror stalk the area A according to drawing Z112a must be closed entirely. With the exception of the mirror stalk no part may be outside the mirror housing.

It may not be attached to transparent parts of the contour

For every 45° section (FL plane rotated 45°, see drawing Z114) only one (1) geometric form may result which must be closed.

Exceptions:

At the interface mirror stalk/vehicle contour the resulting profile may also be closed by the contour of the scaled vehicle.

At the interface mirror stalk/mirror housing the resulting profile may also be closed by the mirror housing.

The scrutineers must be assured through a practical demonstration that each of these exterior mirrors is mounted so that the driver, when seated normally with his safety belts fastened and the steering wheel in place, can clearly see a vehicle driving or standing behind him to the side. The line of sight of the driver may only be redirected once.

To this end, the driver may be asked by the scrutineers to identify digits 150 mm high and 100 mm wide, placed behind the race car according to the following terms:

Height from the ground: 1.000 mm to 1.400 mm

Distance to plane FL (right or left): 2.000 mm

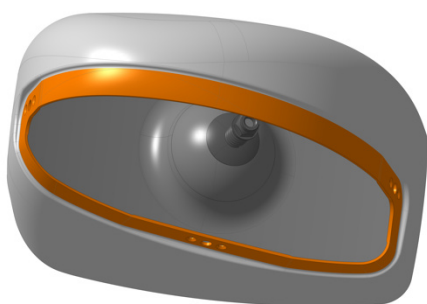
Distance behind the race car (in relation to the centre line of the rear axle): 10.000 mm

The mirror stalk or its mounting on the vehicle must have a predetermined breaking point which must be designed so that the following provisions are met:

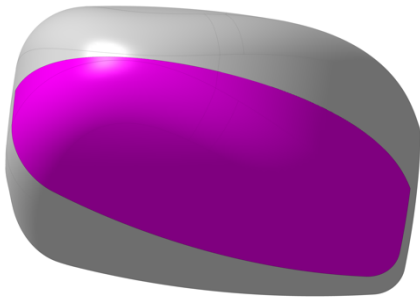
Immediately after a force ($F=100N$ in positive x-direction) is applied to the foremost point of the mirror housing (EB20-077) or (EB20-077.01) in driving direction no part of the housing or mirror stalk that remains in contact with the vehicle may be outside the scaled contour.

Exception:

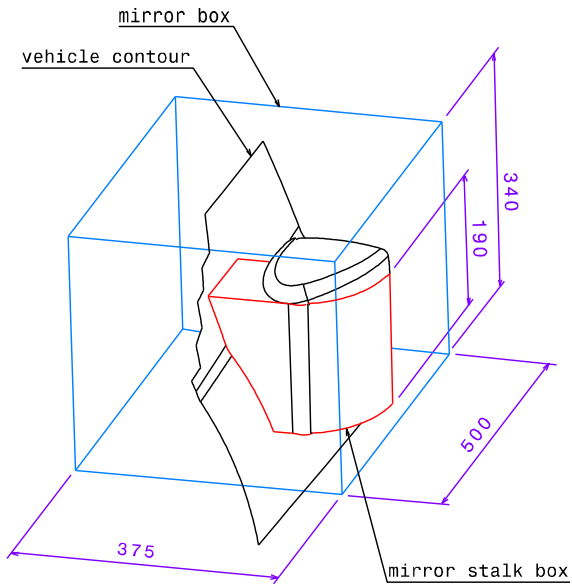
Parts of the mirror stalk if they are not located more than 100mm outside the scaled contour.



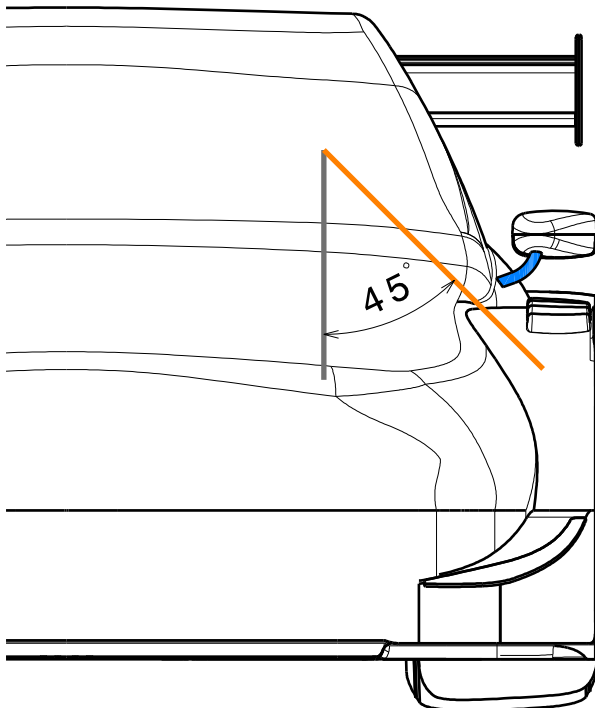
Z112 – Attachment area (marked in orange) for attaching the mirror stalk



Z112a – Mirror housing with closed attachment area (marked in red)



Z113 – Mirror- and mirror-stalk box



Z114 – Orientation of the plane rotated 45° (symmetrically identical on the rhs)

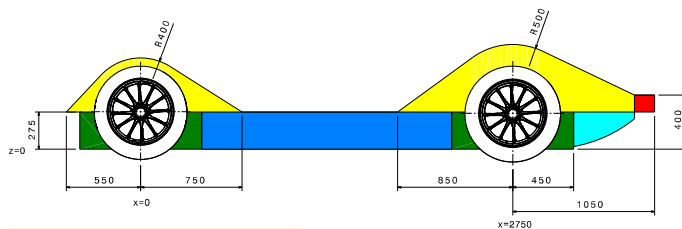
3.20 Material and weight specifications for all bodywork parts above the design line

These material specifications are applicable for the complete component, unless otherwise indicated. If several materials are permitted, the corresponding component must nevertheless be made out of one single material only. If not otherwise indicated, beryllium, ceramic materials, titan, sintered materials, beryllium and boron alloyed aluminium (BORALYN) are prohibited, even if the material specification states “free”.

Component	material specification
Window reinforcement	Free, including CFRP

3.21 Bodywork design below the design line

All surfaces of the race car which are licked by the air stream with closed doors and windows and which are located below the design line must comply with the contour filed during homologation in form of a 3D-CAD record for the race car.



Z30 – Areas below the design line

3.21.1 Design contour

The use of the following components (beside others) is mandatory for vehicles participating in DTM events for the design of the contour below the design line:

- EB20-075 D+J front diffuser
- EB20-082 D+J floor
- EB20-078 D+J rear diffuser
- EB20-105 front flick
- EB20-106 D+J elephant foot
- EB20-107 D+J protection strip
- EB20-108 D+J bargeboard box
- EB20-109 D+J Shoebox
- EB20-111 D+J lower wheelhouse rear
- EB20-112 D+J air duct rear
- EB20-113 D+J mesh guard
- EB20-115 K6 cam bracket (according to the camera allocation)
- SB20-023 closing plate
- SB20-024 flick box
- SB20-026 wheel arch front
- SB20-028 wheel arch rear
- SB20-025 wheelhouse front
- SB20-037 wheelhouse rear
- LB20-024 flick box

The components mounted to the vehicle must reproduce together the surfaces according to “SB20-2020 spec surfaces”. Any individual surfaces which can be licked by the airstream are prohibited in this area.

Exception:

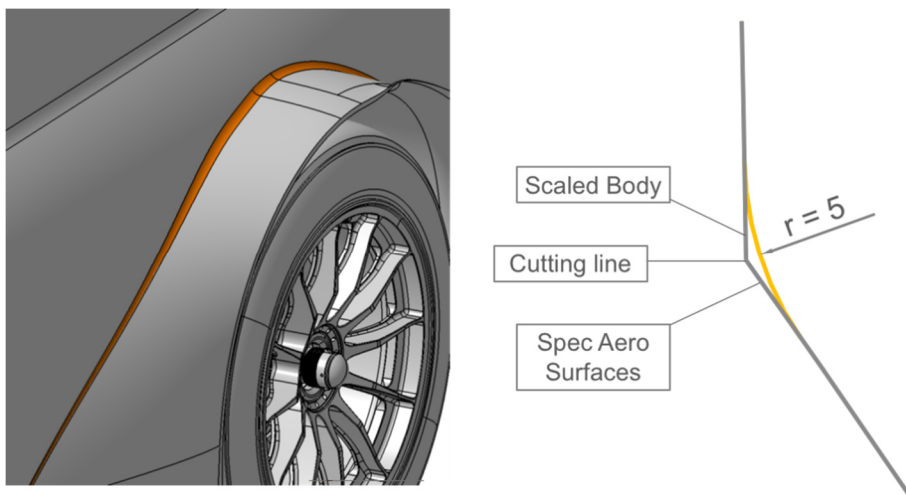
Following Table 99 below, it is expressly allowed to create individual surfaces along gaps and joints which result at the contact point between different parts. Provided that the sole purpose is to bridge the gaps/joints. No point of such a surface may be located more than 2mm apart from one of the two components which are bridged to one another.

Gap or joint between		
Part 1	Part 2	creation of individual surface allowed
EB	EB	no
EB	SB	yes
EB	LB	yes
EB	Individual part (IB-part)	yes
SB	LB	yes
SB	IB	yes
LB	IB	yes

Table 99

The intersection between the scaled contour and “SB20-2020 spec surfaces” may be chamfered tangentially to both surfaces (drawing Z222/222a). The surface hereby created may not have an inflection point and must have a radius smaller or equal 5mm.

All surfaces which do not belong to either the “SB20-2020 spec surfaces” nor to the scaled bodywork must be submitted to the DMSB Technical Delegate for approval by the 1st of March 2019 at the latest. The DMSB Technical Delegate will only approve surfaces which serve the single purpose of creating a harmonious transition from the “SB20-2020 spec surfaces” to the scaled contour. The determination hereof is at the sole discretion of the DMSB Technical Delegate.



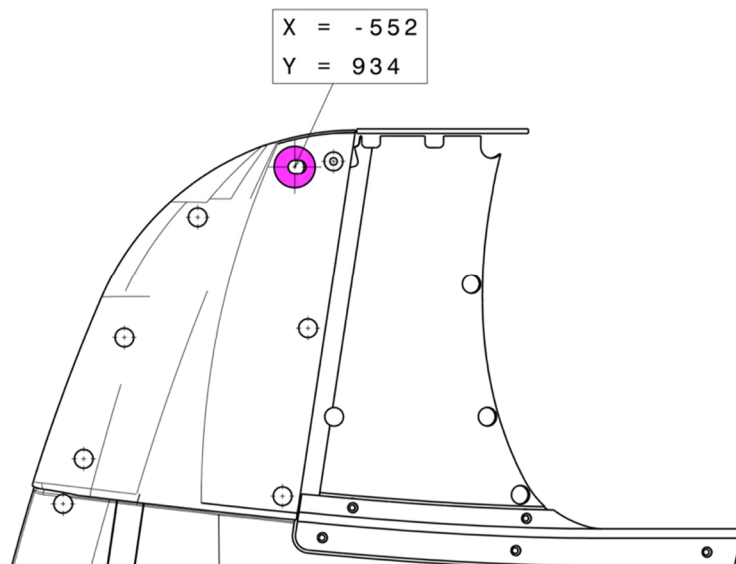
Z116 – Transition spec-surface/scaled contour

3.21.2a Front diffuser (EB20-075 D+J)

On the bottom surface of the front diffuser, in front of the VA plane, the use of max. 1 cylindrical metallic glide pads is permitted on each side of Y=0 provided that they are located solely at the specified positions defined in drawing Z122 and can be removed at any moment upon request of the DMSB Technical Delegates.

Each individual glide pad may have a maximum diameter of 40mm including its attachment and may protrude the flat floor (z=0) by a maximum of 10mm downwards (z=-10).

The central cylinder axis of the glide pads must be z-parallel (± 3 Grad). The metal (also titanium) for the glide pads is free. A glide pads must be attached with one and only one DIN EN ISO 10642 Allen or Torx screw (max. M8) passing through the cylinder axis of the glide pad. The screw must be completely countersunk into the glide pad. The clearance between screw head and glide pad may at no point be bigger than 1mm.



Z122 Sole permitted positions for the fitment of glide pads

3.21.2 Shape of Contour

- a) In compliance with article 3.0 and drawing 2c and 2d an individual design of the shape of the contour below the design line which can be licked by the air stream when doors and windows are closed is permitted for areas for which neither an EB20-, a LB20- nor a SB20-component is mandatory on condition that the shaped and scaled is completely visible in plan view.
- b) The areas/ surfaces of the contour of the scaled car which are visible in front, rear or side view and which – whether below or above the design line – form an undercut in plan view are considered to be transparent for the application of these regulations.

Exceptions for a)

Points/ areas/ surfaces on the race car which may be licked by the air stream and which do not have to be visible in plan view	<ul style="list-style-type: none"> The underbody Points of the front diffuser with add-on parts visible in bottom view The wheel arches The inner surfaces of closed air ducts Parts of the front skirt Parts of the rear skirt Panels of the rear wheel arch Areas with have been legally modified for the attachment of the bonnet fasteners Friction blocks Skid block Engine shear plate Wheels Suspension components which protrude into the wheel arch Area to exhaust diffuse air above rear diffuser The air jacks Part of the contour inside the area marked in red in accordance with drawing 101. The Cockpit and the service box, provided that the air stream is introduced through a driver cooling duct EB20-, SB20- and LB20-components
--	---

3.21.3 Front skirt

The front skirt runs on both sides of the vehicle, outside the contour section which results in plan view at z=275 on the race car (25 mm offset to the contour characteristics defined in drawing Z43, 43a, 43b) and in the below defined (table 13) area:

x	x	y	y	z	z
-450	-925	0	650	top surface front diffuser (EB20-075 D+J)	275

Table 13

The design of the front skirt is subject to the following restrictions:

areas which are licked by the air stream do not have to be visible in plan view.

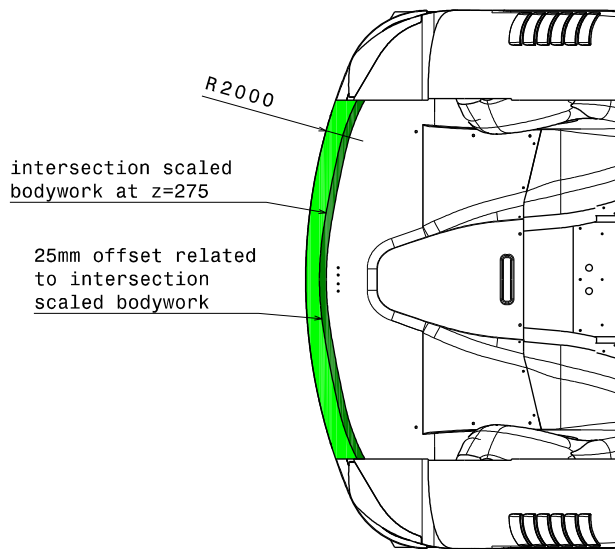
Above $z=5$ until $y=970$ mm, no part of a front wheel must be visible in front view (when driving straight ahead).

Air inlet openings for the connection of closed air ducts in the front skirt are only permitted in the area below (table 14 and drawing Z46).

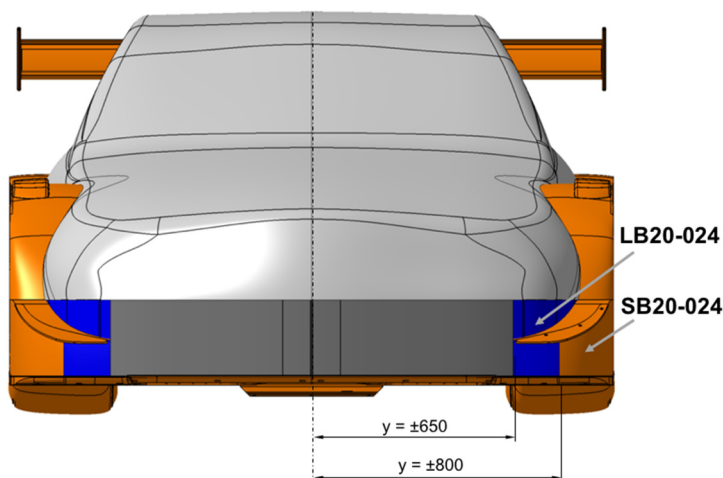
	Y	z	z
0	650	0	275

Table 14

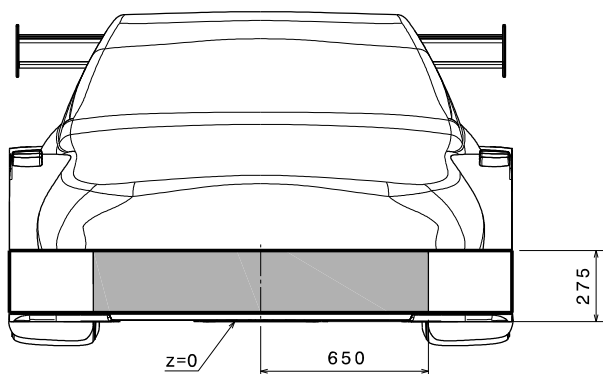
Only air, defined according to article 3.1.3 may be conducted through openings in the front skirt. The corresponding closed air duct must be directly connected to the opening in the front skirt. All the air which is fed in the front skirt through openings must be conducted in closed air ducts to the corresponding destination (see Art. 3.1.2/3.1.3).



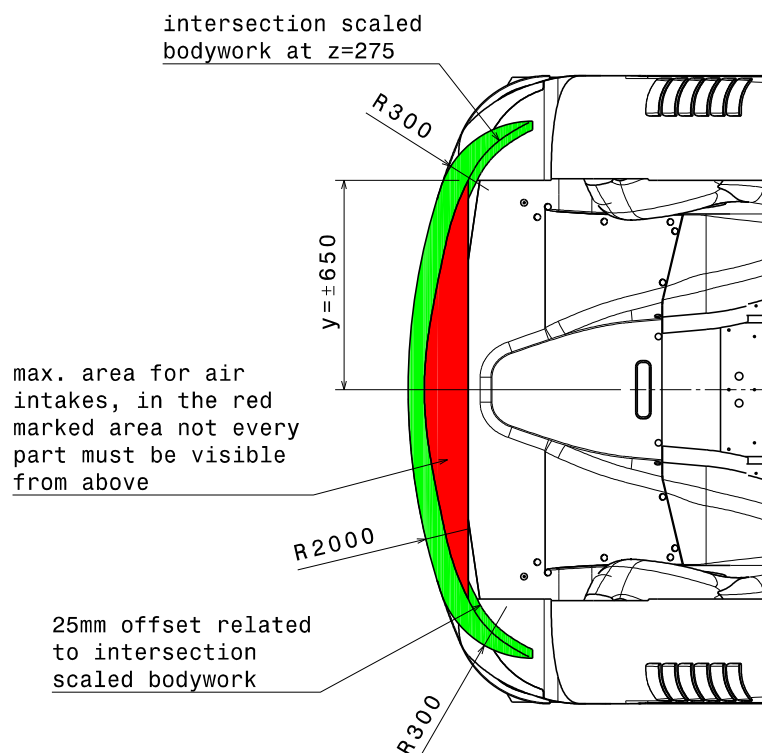
Z43 – Contour front skirt (top view)



Z43a – Contour front skirt (dark grey area – front view)



Z43b Eligible area for openings in the front skirt



Z101 – Area (red) of the contour which do not have to be visible in plan view

3.21.4 Rear skirt

The rear skirt runs on both sides of the race car between $x=3.500\text{mm}$ and $x=3.800\text{mm}$ according to the green surfaces and dimensions in below drawing Z103:

The rear skirt must at no point protrude in plan view over the maximum contour (see drawing Z 15).

The design of the rear skirt is subject to the following restrictions:

- No part of the rear skirt may cover parts licked by the air stream of the underbody (EB20-082 D+J) and/or the rear diffuser (EB20-078 D+J) in rear view.
- A rain light (EB20-093) must be mounted completely inside the allocated design space (drawing Z97/table 50). Viewed from the rear all LEDs of the rain light must be completely visible.
- The section of the rear diffuser defined must be fully visible in side view.
- Inside the “rear restricted volume” (see drawing Z115 and DMSB, mandatory regulation data files, SB20-014 rear restricted volume “rear skirt”) no part of the vehicle may be located.
- All points licked by the air stream below $z=275\text{mm}$ with the rear diffuser (EB20-078 D+J) installed must be visible in bottom view when the rear diffuser is dismounted.

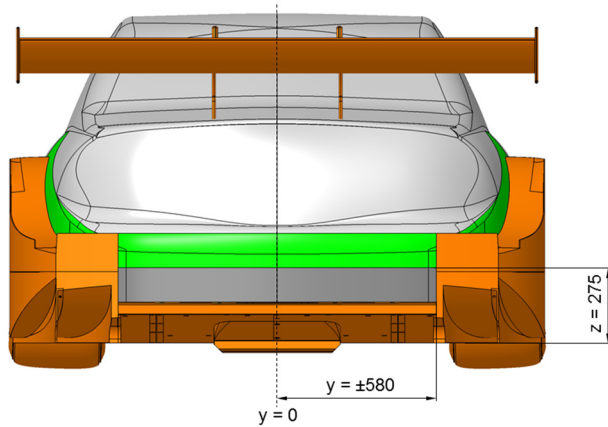
Exceptions to e):

Areas/surfaces of the scaled vehicle which are visible in rear view and which are covered by undercuts in plan view.

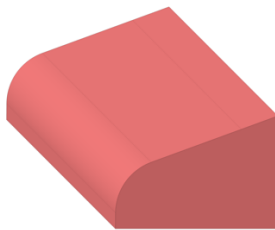
Openings for the discharge of diffuse air may be present in the rear skirt in an area which is limited by:

y	z	z
580	105	275

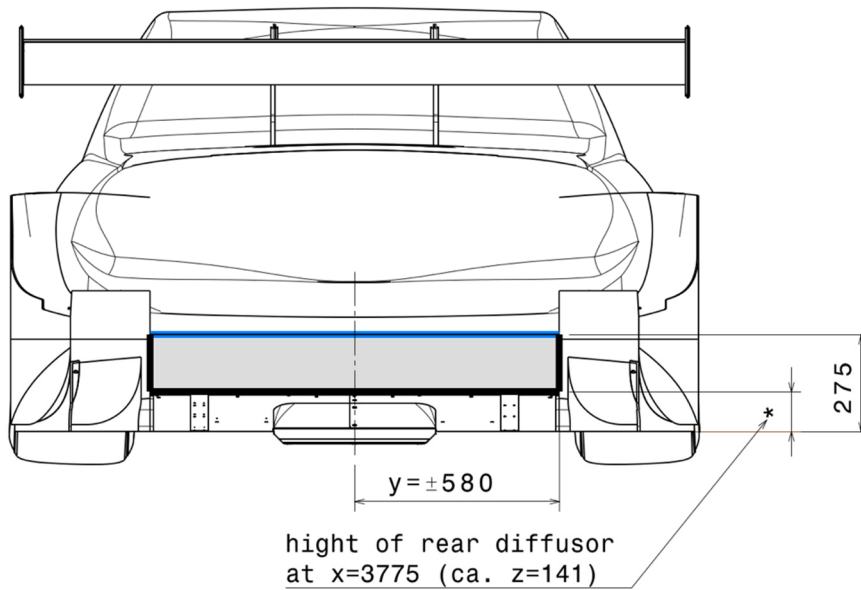
Table 16



Z103 – Rear view of the rear skirt area



Z115 – Depiction of the “rear restricted volume” within no part of the vehicle may be located



Z47a – Eligible area (grey) for openings and the discharge of diffuse air

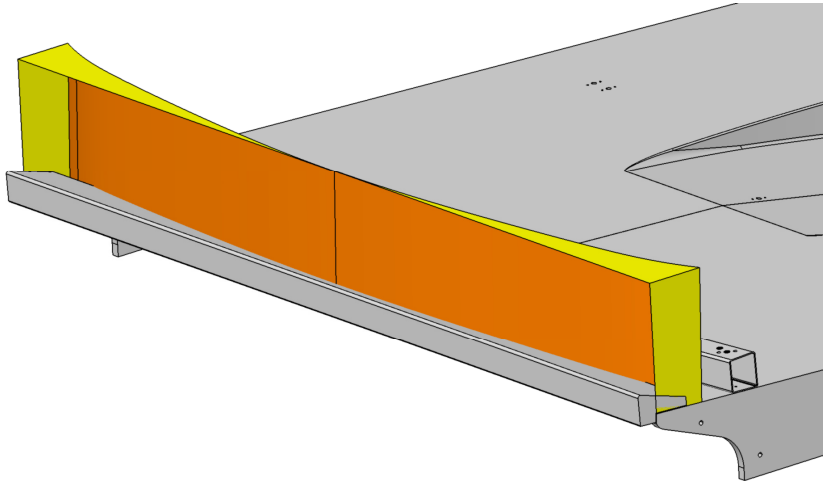
3.21.5 Contour shape rear bumper (SB20-019)

For the areas represented in drawing Z47a for openings to discharge diffuse air the shape of the contour is defined by the virtual body represented in drawing Z97 and Z97a and deposited on the DMSB -server and/or components within the represented area.

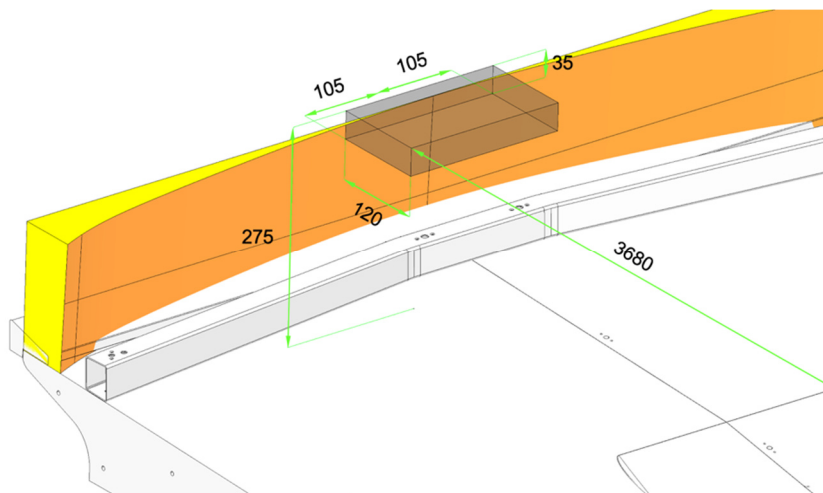
Points/surfaces may be located inside the area for openings to discharge diffuse air which are licked by the air stream but which are not visible in plan view.

X	x	y	z	z
3.500	3.800	105	240	275

Table 50



Z97 – Contour shape rear bumper



Z97a – Permitted design space for the rain light

3.21.6 Advertising space

A plane and flat (tolerance in x-direction ± 10 mm) surface, completely closed and homogenous, with the minimum dimensions 400 mm x 110 mm, must be in placed at the foremost point of the bodywork between $z=200/z=400$ mm and $y=200$ for the fitment of advertising signs. If the scaled standard contour does not have any such surfaces, they must be created. The surfaces must be positioned in parallel to plane VA, with a maximum difference of 15° (upper edge = closer to $x=0$).

The surfaces and possible brackets created hereby must be approved by the DMSB Technical Delegate.

Alternatively, to place one surface only, two mirror-symmetrical surfaces; with minimum dimensions 400mm x 110mm each, must be provided for the fitment of advertising signs.

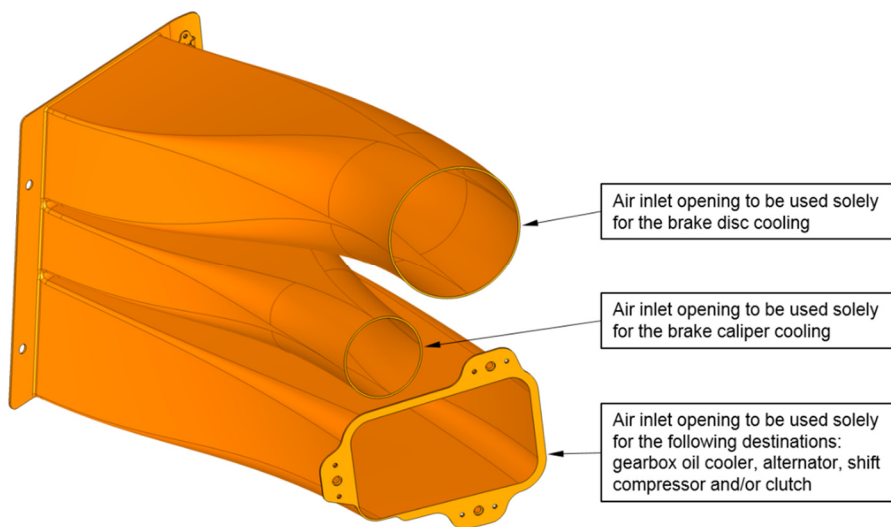
The surfaces, whether it is only one in the centre of the car or there are two mirror-symmetrical ones, are reserved for the fitment of series advertising partners.
The so-called "ITR Beklebungsvorschriften" have to be respected.

3.21.7 Air intakes barge board box

Air which flows through the EB component EB20-112 (L+R) must be used for a specific purpose defined in this article. The following destinations for the cooling air are binding (see drawing Z44 and Z45):

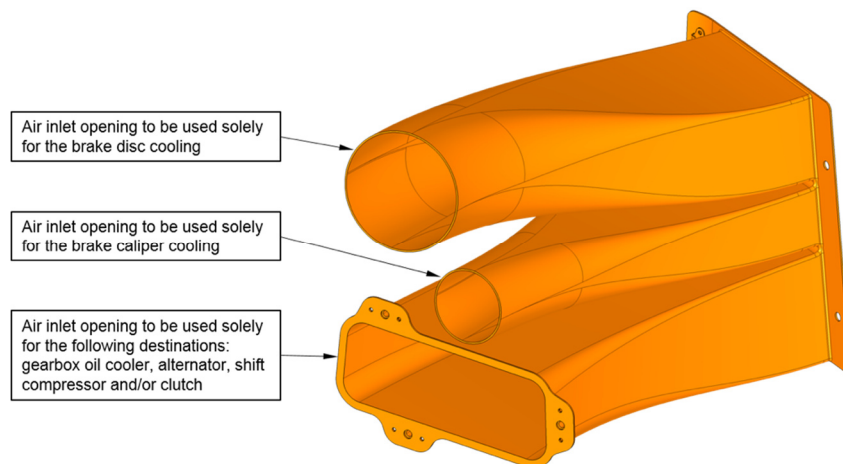
- For EB20-112.L/R: air duct 1: Air inlet opening to be used solely for the brake disc cooling
- air duct 2: Air inlet opening to be used solely for the brake calliper cooling
- air duct 3: Air inlet opening to be used solely for the following destinations: gearbox oil cooler, alternator, shift compressor and/or clutch

EB17-112 R



Z44 – Binding assignment of the air duct openings of EB20-112.R D+J

EB17-112 L



Z45 – Binding assignment of the air duct openings of EB20-112.L D+J

3.22 Components which face towards the ground on which the car stands

Only the following components may be visible in bottom view:

- The floor (EB20-082 D+J)
- The mounting points of the floor
- The skid block (SB20-003)
- The mounting points of the skid block
- The monocoque (EB20-001 D+J) in the area of the reference points
- The front diffuser (EB20-075 D+J)
- The rear diffuser (EB20-078 D+J) with fins
- The wheel arches (SB20-029 wheel house front, SB20-030 wheel house rear)
- Parts of the EB20 rear wing (EB20-023 D+J)
- The exterior mirrors (EB20-077) and the corresponding mirror struts
- The brake air ducts in the wheel house
- The brake lines in the wheel house
- The wheels
- The pneumatic jacks (EB20-017)
- Parts of the rear skirt
- Suspension components in the wheel house
- The engine plate (SB20-006)
- The wheel arch front/rear (SB20-027/SB20-028)
- Glide pads
- Transponder of the official timekeeping

3.22.1b Permitted flexibility of the front diffuser (EB20-075 D+J)

The following applies for the flexibility of the front diffuser:

The splitter mounted completely to the vehicle must not move by more than 5 mm downwards when a load of 500 N is applied vertically. This load is applied consecutively at three points respectively (right, centre and left) by means of a pad with a maximum surface of 1.500 mm². It is permitted to adapt the pad to the contour. It is permitted to place a rubber with a thickness of 3 mm between the pad and the front diffuser. The exact position of the load application as well as the design of the pads must be coordinated with the technical delegate.

3.22.1c Support device front diffuser

The support device FD is an EB20 component (EB20-079) of which two versions exist (EB20-079.01 and EB20-079.02). It is at the sole discretion of the competitor which of the two versions is homologated and used.

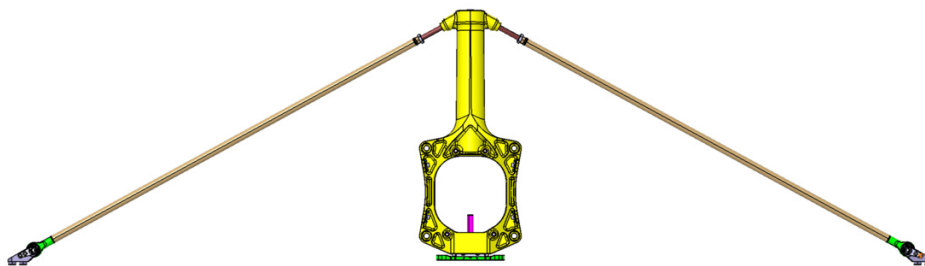
It is explicitly permitted to complement the support device individually with cup springs 28 x 10,2 x 1 according to DIN 2093, provided that they are located solely and fully within the volume defined in drawing Z108 (hatched area) and filed on the DMSB -server under "mandatory regulation data files", SB20-022.

It is explicitly permitted that the support device can move according to the spring deflection of the permitted cup springs (28x10,2x1).

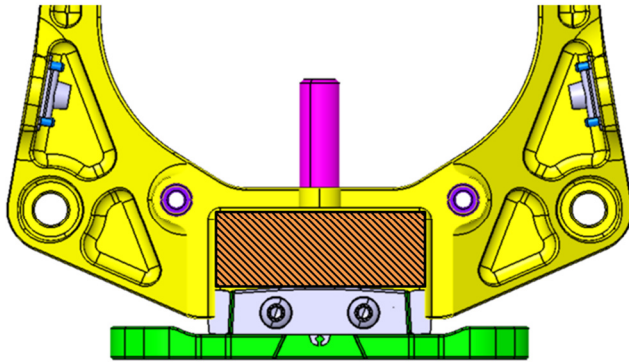
Exception:

The component EB20-079.01.01 or the component EB20-079.02.01 must have no relative motion with regards to the monocoque.

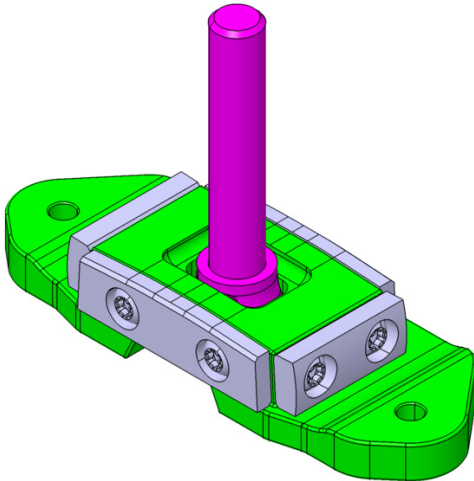
Outside and inside this volume provided for the installation of cup springs no other components whatsoever may be in contact with EB20-079 that in any way could move the front diffuser from its specified position. Provided that these provisions are met it is permitted to attach components to EB20-079.



Z119 – Support device FD (EB20-079)



Z108 – Sole permitted are (hatched area) for the installation of cup springs



Z108a – EB20 components which may move in parallel to the spring deflection

3.22.2 Floor

The floor is an EB20 component (EB20-082D+J).

The openings designed for the passage of the air jacks above $z=0$ (up to the maximum of $z=40$ mm) may be provided with an insert which reduces the openings to a diameter of 65 mm and which is intended to guide the pistons of the air jacks. The maximum permitted diameter for the inserts is 115 mm. The material of the inserts is free.

Only screws may be used for mounting the floor. The maximum permitted dimension for the screws is M6. No part of these screws may be below $z=0$.

The passage holes and the recesses, when mounted, must be closed by means of screw heads and washers where appropriate.

3.22.2a Ground Clearance

When the vehicle stands on its wheels no part may be located below EB20-082 D+J (tolerance in $z = -3$ mm).

Exceptions:

- Parts of the wheels and suspension
- Parts of the air jacks (when extended)

Parts of the skid pad frame (EB20-035 D+J)
Parts of the skid block (SB20-003)
Engine shear plate (SB20-006)
Ballast (EB20-045) and their mountings as defined in the sporting regulations
Slide pads according to 3.22/18

3.22.2b Floor flexibility

The following applies for the flexibility of the floor:

The floor mounted completely to the vehicle must not move by more than 5 mm downwards or by more than 5 mm upwards when a load of 500 N is applied vertically. This load is applied consecutively at three points respectively by means of a pad with a maximum surface of 1.500 mm². It is permitted to adapt the pad to the contour. It is permitted to place a rubber with a thickness of 3mm between the pad and the floor. The exact position of the force application as well as the design of the pads must be coordinated with the technical delegate.

3.22.3 Rear diffuser

The rear diffuser is an EB20 component (EB20-078 D+J)

The following applies for the flexibility of the rear diffuser:

The rear diffuser mounted completely to the vehicle must not move by more than 5 mm downwards or by more than 5 mm upwards when a force of 500 N is applied vertically. This force is applied consecutively at three points (right, centre and left) respectively by means of a pad with a maximum contact surface of 1.500 mm². It is permitted to adapt the pad to the contour. It is permitted to place a rubber with a thickness of 3 mm between the pad and the rear diffuser. The exact position of the force application as well as the design of the pads must be coordinated with the technical delegate.

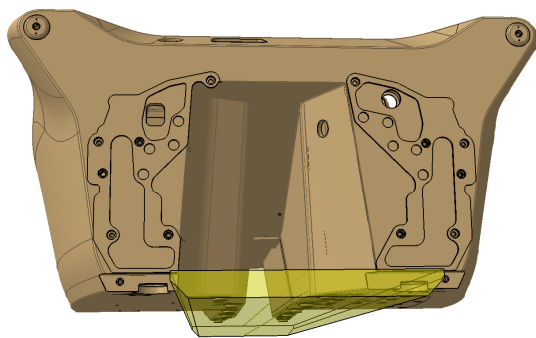
3.22.4 Skid pad frame

The skid pad frame is an EB20 component (EB20-035 D+J).

Individual mounting points on the upper side of the skid pad frame, behind $x=1,500$ and complying with the provisions of Article 15.1.1, are permitted. Only parts of the underbody may be fitted to these points.

On the upper side additional mounting points are located for ballast. Solely ballast weights (EB20-045) may be mounted to these points. The attachment material for ballast may weight combined no more than 400 gram.

In addition, no further components may be located inside the volume SPR (see DMSB -server, „mandatory regulation data files“, EB20-035 D+J and Z120).



Z120 – Volume SPR

3.22.4a Skid block/Skid-Pad

The skid block is a SB component (SB20-003) which must at all times during the event comply with the following minimum height (in Z):

Area	Mandatory minimal height
x = 75 to x = 200 mm	5mm
x = 200 to x = 2.410 mm	6mm
x = 2.410 to x = 2.530 mm	5mm

Table 18

The skid block may be provided with a total of 18 through holes with a diameter of 6 mm, located at the following positions (hole centre point):

Hole	Position in x (mm)	Position in y (mm)
1	180	160
2	180	0
3	180	-160
4	400	160
5	400	0
6	400	-160
7	880	160
8	1.020	0
9	880	-160
10	2.025	160
11	1.630	0
12	2.025	-160
13	2.205	160
14	2.205	0
15	2.205	-160
16	2.455	160
20	2.455	0
18	2.455	-160

Table 19

Lines 4 – 15: Minimum thickness 6 mm

Lines 1 – 13 and 16 -18: Minimum thickness 5 mm

For the fixation of the skid block only M6 screws with countersunk heads according to DIN EN 10642 and/or DIN EN 14581 may be used.

In the area of the skid block no attachment material may be located below z=-32. In the area of the skid block no part of the vehicle may be visible from bottom view with the exception of the skid block, the countersunk heads of the attachment screws and the skid pad frame (through the permitted wear holes).

In order to check the skid thickness, a measuring tool with a round contact surface running in parallel on both sides of the skid and having a diameter of 30 mm will be used, measuring the distance between these two surfaces.

The measuring tool will be placed so that the contact surfaces are completely located in an area which is limited by

x	x	y
75	2.530	200

and so that during the measurement procedure they are not in contact with x=200 or x=2.410.

If the skid pad disposes of permitted milling pockets according to the specification sheet, the competitor must provide circular fittings with a diameter of 50mm for the measurement, whose height/thickness corresponds to the shape of the milling pocket. The tolerance for the height of the fittings in relation to the depth of the milling pocket is +0,2 mm. The fittings are placed for the duration of the measurement between the supporting surfaces of the measuring tool.

The mandatory minimum dimension is not respected if an incorrect value (non-compliance with the mandatory minimum height) is measured at two or more measuring points having a minimum distance of 50 mm from each other.

It is explicitly permitted to apply 2 individual through holes with a maximum diameter of 20 mm each into the SB component.

4. Weight

It will be distinguished between three minimum weights

The mandatory minimum weights must be respected at all times during an event.

4.1 Total minimum weight

The total minimum weight is composed of:

The minimum weight of the car

The minimum weight of the driver

The total minimum weight is 1.070 kg (tolerance: -2kg).

4.2 Minimum weight of the car

The minimum weight of the car is composed of:

The actual weight of the vehicle at the time of measurement

The weight of the inboard cameras assigned by the ITR respectively the weight of the balance weight (see article 18.1) and the dummies (if no inboard camera is appointed)

but without

Driver balance weight

Driver and his equipment

The minimum weight of the car is 986 kg (tolerance: -2 kg).

4.2a Level of liquid

The relevant total minimum weight and the minimum weight of the car must also be respected when the water container or containers provided for the cooling of the brakes is/are empty and the fuel system does not contain any fuel.

It is at the discretion of the DMSB Technical Delegate whether the driver balance weight must be dismantled for the determination of the actual weight of the car or if the weight is deducted by way of calculation.

4.3 Minimum weight of the driver

The relevant minimum weight of the driver is composed of:

The driver

The driver's personal equipment as carried on board at the moment the car was selected for weighing.

Driver balance weight, if applicable.

The minimum weight of the driver must be 84 kg (tolerance: -2kg)

4.4 Driver balance weight

If the actual weight of the driver (including the parts of his personal equipment which were present in the car the last time the car was on the track before or during the car was selected for weighing) is below 84 kg, the weight difference (with regard to 84 kg) must be added in form of ballast to be exclusively fixed at the mounting points of the lap and crotch safety straps.

Components of the homologated safety belts cannot be declared as driver balance weight.

It is the responsibility of the competitor to ensure that the total of the installed driver balance weight and his actual weight (plus the items of his personal equipment as carried on board at the moment the car was selected for weighing) complies with the minimum weight of 84 kg.

4.5 Separate weighting

If the total minimum weight is checked with the driver outside the car, the driver including the parts of his personal equipment which are located inside the vehicle at the moment the car was selected for weighting and the car are weighted separately from each other. The tolerance on each of the so determined individual weights is 2 kg.

To determine the total weight however both of the individual weights are added without any tolerances. A tolerance of 2 kg is granted to the result of this summation.

The DMSB Technical Delegate and/or the scrutineers can decide to weight the race car and the driver separately from each other.

The process of weighting is described in the sporting regulations.

4.6 Weight during qualifying and race

During qualifying, the weight of the race car may only be increased, changed through:

Refuelling (without the use of the quick refuel valve)

Replenishment of cooling water for the brake system

Change from slick to rain tyres or vice-versa,

During the race, the weight of the race car may only be increased, changed through:

Change from slick to rain tyres or vice-versa,

Refuelling (without the use of the quick refuel valve)

Refilling of engine oil (permitted only if race distance is > 300km)

No weight may be added to the vehicle, to the driver and/or to his personal equipment on the way from the track to the parc fermé or in the parc fermé in any form.

4.7 Ballast

It is permitted to use ballast. The ballast must not change its position in relation to the monocoque whilst the car is in motion.

Only the ballast weights of EB20-45 may be mounted as ballast to the skid pad frame (EB20-035 D+J). The maximum number of EB20-045 to be mounted to the skid pad frame is 8.

No ballast may be positioned on or inside the front, rear or lateral crash structures as well as the associated adapters (EB components 006, 007, 037 and 038).

5. Engine and exhaust systems

The parts listed in below table 26 are EB components relevant for this Article.

Parts specification	Component number
Engine Control Unit ECU	EB20-022
Fuel-Flow-Restrictor	EB20-069D
Turbocharger	EB20-070
Catalytic converter	EB20-074
High pressure fuel pump	EB20-119 D (max 350 bar) EB20-119 J (max 200 bar)
Injector Nozzle	EB20-066

Table 26

The parts listed in the below table 30 are seen as LB components relevant for this Article.

Parts specification	Component number
E-Gas control motor/throttle valve	LB20-028
Wastegate	LB20-064
Ignition coil	LB20-067
Torsional vibration damper	LB20-117
Spark Plug	LB20-029

Table 30

The parts listed in the following table 31 are SB components relevant for this Article.

Part specification	Component number
SB20-029	Intercooler net

Table 31

The use of an engine homologated by the DMSB which complies with the regulations in this article 5 is mandatory. Only the following engine homologations are permitted.

Make	Homologation number
Audi	??
BMW	??
Aston Martin	??

Table 28

Dimensions and weights which are not defined in this article 5 as a “min” or “max” dimension/weights and/or for which no special tolerance is given, a minus tolerance of 1% for the relevant measurement applies.

There is no minus tolerance on minimum dimensions (min or \geq).

There is no plus tolerance on maximum dimensions (max or \leq).

5.1 Engine type

Only four stroke piston engines with Otto cycle (max. one per car) with direct fuel injection and turbocharging are permitted.

The use of any device, other than the engine described in that article 5 to propel the car, is not permitted.

Only inline engines are permitted. All cylinder bore axis must lie on the ZL-plane (see drawing Z-M2)

The centre bore axis of the cylinders must run parallel

to the FL- and Y-plane of the car, tolerance $\pm 2^\circ$.

All four cylinders must be of equal capacity.

The target minimum mileage of the engine – before braking/opening one or more official seals – is 6.000 km.

5.1.1 Displacement

The maximum cubic capacity is 2.000 cm³.

5.1.2 Rev limit

Under power, when the engine is pushing the car, the maximum crankshaft rotational speed must not exceed 9.500 rpm.

5.1.3 Fuel/Mass flow

Fuel mass flow to the combustion chambers must not exceed 95kg/h.

The fuel mass flow to the combustion chambers is controlled by the EB20-119 D and EB20-119 J high pressure fuel pump in combination with the profile of the cam and by the fuel flow restrictor EB20-069D.

Fuel which is delivered to the combustion chambers must be directed completely through the fuel flow restrictor (EB20-069D).

Any means whatsoever which allow to increase the fuel mass flow in and/or after the fuel flow restrictor (EB20-069D) or which allow the manipulation of the findings of the fuel flow restrictor are prohibited.

Any device, system or procedure the purpose and/or effect of which is to store and/or recycle fuel after the fuel flow restrictor and that cannot be seen as a fuel line is prohibited.

The fuel flow restrictor must be mounted inside the Tank box at the given place (see drawing z133) by using bracket EB20-069.1

Exceptions:

During the time the push-to-pass system is – in accordance with the sporting regulations – activated, the fuel mass flow may go up to 100kg/h.

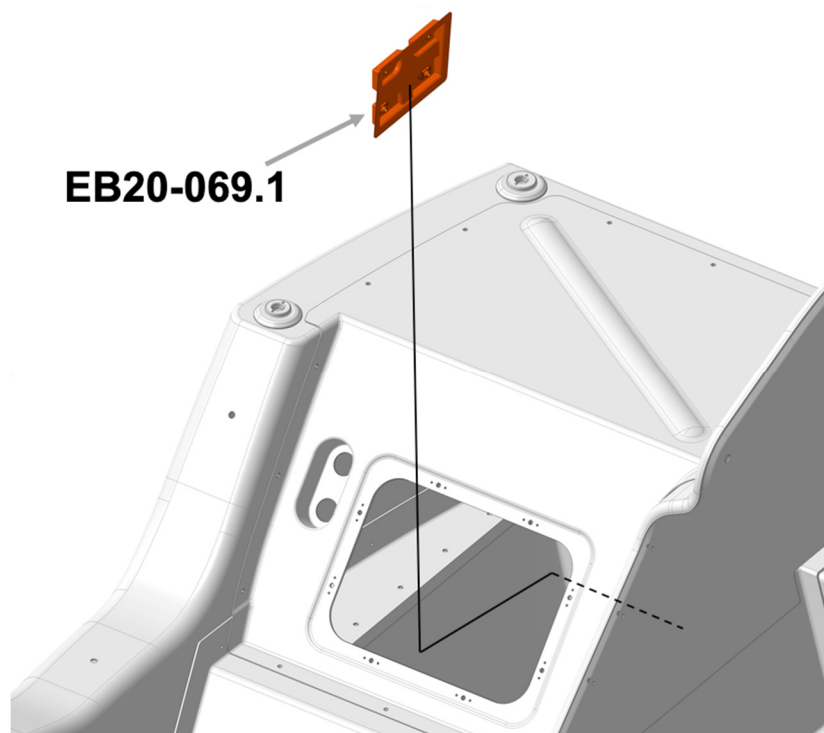
5.1.3.1 Push-to-Pass

When the Push-to-Pass System is activated:

- Fuel mass flow to the combustion chambers must not exceed 100kg/h.
- Fuel mass flow to the combustion chambers is controlled by the EB20-119 D and EB20-119 J high pressure fuel pump in combination with the profile of the cam and by the fuel flow restrictor EB20-069D.
- Fuel which is delivered to the combustion chambers must be directed completely through the fuel flow restrictor (EB20-069D).
- Any means whatsoever which allow to increase the fuel mass flow in and/or after the fuel flow restrictor (EB20-069D) or which allow the manipulation of the findings of the fuel flow restrictor are prohibited.

When the Push-to-Pass system is deactivated article 5.1.3 must be respected unconditionally.

The fuel flow restrictor must be mounted inside the Tank box at the given place (see drawing z133) by using bracket EB20-069.1



Z123- Mounting position of Fuel Flow Restrictor bracket

5.1.4 Compression ratio

The maximum permitted geometrical compression ratio (ratio of the combustion chamber volume above the piston at bottom dead centre to the volume above the piston at top dead centre) is 15:1.

The geometrical compression ratio must not change.

Checking the compression ratio have to be done by volumetric measuring.

5.1.5 Engine Weight

The minimal weight of the operational engine is 85 kg.

The following parts are taken into consideration for the determination of the engine weight:

- The complete cylinder head
- Complete engine block
- Complete crankshaft drive (crankshaft, conrods, piston, piston pin with circlip, bearings, propshaft flange engine side)
- Torsional vibration absorber according to 5.19
- Dry sump
- Oil pumps (without pipework)
- Oil filters directly mounted to the engine
- Oil thermostat
- Water pump
- Injection rail and injectors
- High pressure fuel pump with high pressure fuel lines
- Complete valve train
- Timing cover
- Ignition coils
- 4 Spark plugs
- Throttle engine (LB20-028)
- Airbox/chamber
- Intake manifold
- Engine wiring loom up to the first coupling joint
- Belt pulleys for auxiliaries (engine side)
- All screw and fastening components for protruding parts
- Sensors out of table 39 (except Sensors No 5, 8, 15, 17) as long as they are mounted directly and only to one of the above listed parts. *
- All parts which can only be removed after one or several DMSB seals are removed or destroyed.*

* It is up to the DMSB Technical Delegate of the series concerns to decide, if any mounting/fixing of parts is apparently done in a way to bypass the intention of that wording.

The following parts are not taken into consideration for the determination of the engine weight and must be fixed in a way, that they can be removed without breaking a DMSB seal:

- Fluids
- Oil tank (oil containing components with a diameter of > 20mm)
- Oil cooler
- Coolant tank
- Engine bracket
- Adapter plates
- Exhaust manifold after cylinder head flange
- Turbo charger bracket
- Wate gate control unit
- Alterntor EB20-014
- Starter EB20-015
- Crashadapter (SB20-009)
- Front Subframe (EB20-002)
-

5.2 Installation, orientation

With the exception of parts of the engine electronics and parts of the low pressure fuel pump, low pressure fuel pipes no part of the engine or auxiliaries may lie behind $x = 540$ mm

5.2.1 Position of the crankshaft

In reference to the vehicle coordinate system the crankshaft centre line of the mounted engine must be located at

Y*	Z**
0	105

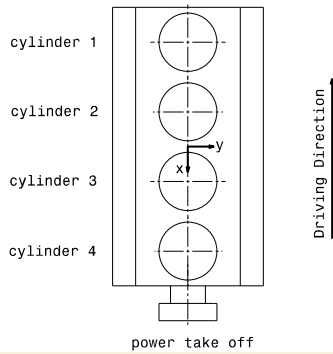
Tolerances: * = $\pm 1,5$ mm; ** = ± 3 mm

The crankshaft centre line must:
 be parallel to the FL- and z0-plane. (Tolerance for parallelism $\pm 1,5\text{mm}$)
 run along $z = 105\text{mm}$

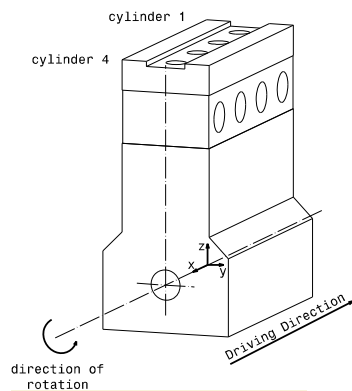
When the engine is running the output shaft must rotate counter-clockwise (viewed in driving direction).

Cylinder 1 is located opposite of the power output side.

top view



Z61- Cylinder numbering and power output side



Z62- Crankshaft rotation direction

5.2.2 Mounting

To fix the engine to the Monocoque (EB20-001 D+J) max 10 (5 y+/5 y-) pick up points out of 14 shown in table 32 below may be used. On the engine side the pickup points have to be an intrinsic part of the cylinder-block and/or the cylinder head/cylinder head cover.

The load transmission surface around every pickup point is limited by a radius of 20mm around the pickup point centre. Beside that surface and the screw passing through the centre of the pickup point, no part of the engine or any kind of bracket/device between the engine and the monocoque, may have a force locked connection to the monocoque.

	X	Y	Z
EMP1	455	-150	528
EMP2		-200	485
EMP3		-200	440
EMP4		-182	288
EMP5		-200	17,5
EMP6		-100	17,5
EMP7		+150	528

EMP8		+200	485
EMP9		+200	440
EMP10		+182	288
EMP11		+200	17,5
EMP12		+100	17,5
EMP13		+200	530
EMP14		-200	530

Table 32

To fix the engine to the front sub frame (EB20-002) max 8 (4 y+/4 y-) pickup points out of 18 shown in table 33 may be used. On the engine side the pickup points have to be a intrinsic part of the cylinder-block and/or the cylinder head/cylinder head cover.

The load transmission surface around every pickup point is limited by a radius of 20mm around the pickup point centre. Beside that surface and the screw passing through the centre of the pickup point, no part of the engine or any kind of bracket/device between the engine and the subframe may have a force locked connection to the subframe.

	X	Y	Z
EMP15		-100	488,7
EMP16		-100	488,0
EMP17		-100	440,5
EMP18		-75	305
EMP19		-70	285
EMP20		-215	17,5
EMP21		-115	17,5
EMP22		+100	488,7
EMP23		+100	488,0
EMP24	-45	+100	440,5
EMP25.		+88	305
EMP26		+70	285
EMP27		+215	17,5
EMP28		+115	17,5
EMP29		-57	488,7
EMP30		-57	488,0
EMP31		+57	488,7
EMP32		+57	488,0

Table 33

Beside the above-mentioned fixation points, any other rigid connections between engine and vehicle are only permitted on SB components.

Exception:

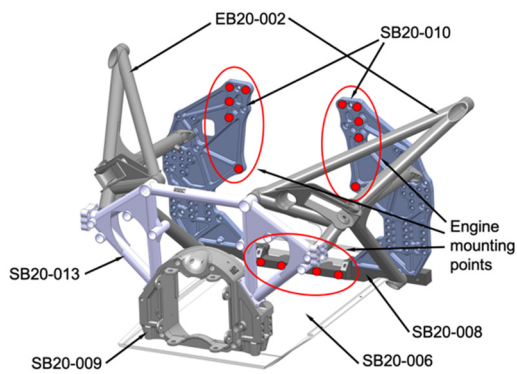
The rigid connection to the propshaft flex disc (LB20-031) is permitted.

X	X	Y	7	7
420	540	400	-10	60

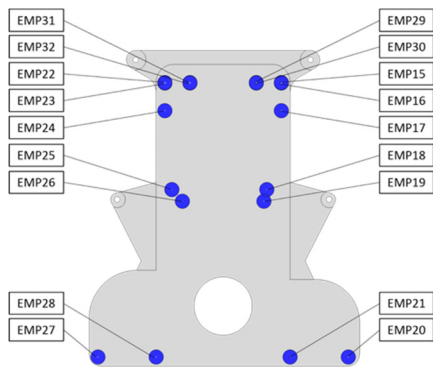
Table 33a

	X	Y	Z
fixation point 1	515	+353	30,5
fixation point 2	515	-353	30,5

Table 33b



Z63- Position of engine attachment points (chassis side)



Z66- Position of engine attachment points (engine side)

5.3 Engine block

Engine block and cylinder head must be separable by unfastening screw connections. The separation line plane (sealing surface) must be perpendicular to the cylinder centre bore axis.

5.3.1 Material

The engine block material must be made out of a steel/iron or aluminium alloy.
The shape of the engine block must be made from a casting; a machining process from a solid is not permitted.

5.3.2 Dimensions

The distance between the flange surfaces of the mandatory front and rear mounting points (see 5.2.2 and drawing Z-105) must measure 500 ± 0.5 mm. No part of the engine block, valve train / timing assembly and/or cylinder head may protrude beyond the flange surfaces.

The distance between the crankshaft centre line and the lowest point of the engine has to be:

min. 100 mm

max. 105 mm

5.3.3 Bore and cylinder spacing

- Every cylinder bore must be between a minimum diameter of 86 mm and a maximum diameter of 90 mm.
- The cylinder bores must have a circular cross section.
- Cylinder tolerance (form): 0,2 mm following DIN ISO 1101
- The cylinder bore centre distance between cylinder 1 to 4 must be identical ($\pm 2,5$ mm).
- The centre bore distance can be chosen freely.

5.4 Crankshaft drive

5.4.1 Crankshaft

- The power output must be located behind cylinder 4.
- The crankshaft must weigh at least 10kg (without driving gear) when ready for installation and must be completely manufactured out of one homogenous piece of steel.
- A maximum of 10 removable plugs (also metallic), which sole purpose is to close drill or thread holes may be added. The maximum permitted weight per plug is 10 grams.

No any other part will be respected when the weight is checked.

Separable balance weights are not permitted.

The following dimensions (table 34) are mandatory

Main bearing diameter	≥ 50 mm
Main bearing journal width	≥ 15 mm
Connecting rod bearing journal diameter	≥ 41 mm
Connecting rod bearing journal width	≥ 18 mm

Table 34

Only plain bearings are permitted for the crankshaft and connecting rod (big end and small end) bearings.

5.4.2 Connecting rods

The connecting rods must be made from one homogenous piece of steel. Each connecting rod including all mounting parts for the connecting-rod bearing cap (e.g. connecting-rod screws) and the sleeve for the piston pin must have a minimum weight of 390 gram.

Width and diameters must comply with the dimensions defined in table 34

5.4.3 Pistons

Each piston including the piston pin, the piston rings, sleeve for piston pin and all mounting parts must have a minimum weight of 370 gram. The piston pin must be made out of steel and have a minimum diameter of 20,0 mm.

Minimum two piston rings must be used for which the following (table 35) dimensions are mandatory:

top rings	$\geq 0,77$ mm
lowest ring	$\geq 1,40$ mm

Table 35

5.5 Cylinder head and valve train

5.5.1 Cylinder head

- a) Only one cylinder head is permitted. The cylinder head (without valves and valve train) must be a single part made out of homogenous aluminium.
- b) The exhaust openings of the cylinder heads must be located, when viewed from cylinder 4 to cylinder 1 on the right-hand side of the engine.
- c) The use of roller and/or rolling bearings for the camshaft bearing is prohibited.

Exception on c:

The two outer bearings of any camshaft may be a roller or rolling type one.

- d) Engines must have two inlet and two exhaust valves per cylinder.
- e) The sealing surface between the valves and the cylinder head must be circular.
- f) The sealing surfaces must be located inside the cylinder head.

5.5.2 Camshafts

The cylinder head must contain two camshafts of which one operates 8 inlet valves and one operates 8 exhaust valves. The camshafts must be made out of homogenous steel. The minimum weight of a camshaft (without drive gear) is 1 kilogram. The base circle of the cam lobes is free. All camshaft bearings must have a diameter of $\geq 22,9$ mm. The number of bearings is not limited. Any hydraulic or pneumatic systems within the camshaft drive are forbidden.

Exception:

hydraulic chain tensioner

The camshaft can be driven from the crankshaft with timing chains or spur gears. Every other mean of drive is prohibited.

5.5.3 Valves

- a) The exhaust valves must be made completely out of iron or nickel and/or cobalt based alloys. Valve stems may be hollow. The cavity may be filled with sodium and may be sealed by welding.
- b) Any movement of the valves must be driven by the camshaft and by using mechanical components only. Any electrical, pneumatic or hydraulic devices are not seen as mechanical components.
- c) Under no circumstances the timing and/or the lift curve and/or the maximum valve lift may change while the engine is operating. (Variable Valve timing forbidden)
- e) All valves may only be closed by means of helical springs. Every other mean of bringing the valves back to the initial position is prohibited; sole exception is the cylinder pressure. A maximum of 2 helical springs are permitted per valve.
- f) Only reciprocating valves with axial displacement are permitted.
- g) The maximum permitted valve lift is 15mm.
The maximum permitted diameter of an inlet valve is 36,5 mm.
The maximum permitted diameter of an exhaust valve is 32 mm.

5.5.4 Arrangement of the injector – EB20-066

It is allowed to modify the injector spray pattern individually.

For each cylinder a maximum of one injector is permitted. The position of the injector is free.

Aside from fuel (according to sporting regulations) that have gone through the fuel flow restrictor (EB20-069D) before and air that have gone through the compressor housing of the turbo charger (EB20-070) before no other whatever substance (in whatever aggregate state) may be supplied to the combustion air or to the exhaust gas at any time.

5.6 Induction system – turbocharger

Solely the vacuum created by the movement of the pistons, the fuel delivered by the injectors and the excess pressure created by the EB-component "turbocharger" (EB20-070) may be used to increase the mass of the air-fuel mixture in the combustion chambers.

Only the unmodified exhaust gases may be used to power the turbocharger. Any other, whatever system or device that effects the turbocharger speed is prohibited.

5.6.1 Boost pressure

At no moment when the engine is under load may the excess pressure of the combustion air (boost pressure) be more than 3,5 bar (absolute) before entering the combustion chamber.

Exception:

The maximum boost pressure may be exceeded by max 150 mbar for a period of 500 ms.

In order to control the boost pressure, a sensor must be mounted in the place where the combustion air will have the highest pressure before entering the combustion chamber. At any time the DMSB Technical Delegate may ask to replace the sensor or to add an additional boost pressure sensor.

5.6.2 Waste gate (LB20-064)

No other air than compressed air coming from the turbo charger is allowed to drive the waste gate.

5.7 Throttle valve and accelerator pedal

a) Any whatever system or device, that effects the turbo speed (known as 'anti lag system') is forbidden.

Exceptions to a:

Under the condition, that its speed is only influenced by position of throttle valve, and/or time/quantity of injection and or time/duration of ignition the use of exhaust gas to speed up the turbo charger is expressly allowed. Any gas or liquid entering the hot side of the turbocharger must have passed at least one of the combustion chambers before.

b) All air delivered to the combustion chambers must be guided through the throttle valve before.

Exception to b:

One idle bypass per throttle valve with a max diameter of 3mm each is permitted.

c) The movement of the throttle valve may only be executed by the e-gas-motor (LB20-028).

The E-Gas control motor/throttle valve LB20-28 may only be controlled by the ECU (EB20-022).

Any kind of traction control, meant as influencing the engine torque release, is forbidden.

d) The vehicle may not be equipped with any device which allows modifying the position of the pedal or the signal of the accelerator pedal travel sensor (EB20-020 pedal box) other than through the movement of the driver foot.

Exception:

gear shift related blips from ECU (EB20-022)

The throttle valve (LB20-028) must be located after (downstream of) the compressor of the turbocharger and after (downstream of) the intercooler and in front (upstream) of the DMSB boost pressure measuring points and the cylinder head.

e) With the exception of modifying the throttle pedal position the driver may not have any possibility of influencing the torque delivery of the engine.

Designs which allow specific points along the accelerator pedal travel range to be identified by the driver or assist him to hold a position are not permitted

f) Without any force exerted by the driver the throttle pedal must return from every possible position independently within 0,5 second to the neutral position.

In the neutral position of the throttle pedal the angle of the throttle valve may only divert from the neutral position by 2°.

The two end stops of the throttle pedal (neutral position – full throttle) must coincide with the minimum and maximum torque available of the active mapping at that moment.

- g) A maximum of
- 4 mappings (during races without driver change)
 - 8 mappings (during races with driver change)
 - for the dependencies between throttle pedal position and throttle valve position are permitted to be stored in the ECU.

In any case an increase in engine torque may only be caused by modifying the position of the throttle pedal or by the torque controller of the ECU (EB20-022).

5.8 Variable geometries in the air intake

Any device or system which enables a variable geometry of components which are in contact with combustion air is forbidden.

Exception:
 The throttle valve
 Compressor wheel of the turbocharger EB20-070

5.9 Intercooler/Intercooler core (SB20-029)

- A max number of one cooler may be used to cool the compressed combustion air. The shape of the coolers is free; however, the maximum permitted volume (L x H x W of the box in which all visible core parts fit) of the cooler is 12,5 litres.
- Any part of the intercooler air flows through must be identical to the core prescribed as SB20-029.
- Only the radiators in accordance with Article 7 (for engine coolant only) and the air flow may be used for heat exchange.
- Any other, even temporary device or method to cool the combustion air is prohibited.
- The surfaces of components containing combustion air (not applicable for EB- LB- or SB-components) may not have any cooling fins. Those parts may be wrapped with heat protection only.

The assessment of this is at the discretion of the DMSB Technical Delegate.

5.9.1 Pressure accumulator

A pressure accumulator in the induction system is forbidden. The combustion air containing system after (downstream of) the compressor of the turbocharger is not classified as a pressure accumulator.

5.10 Exhaust system

5.10.1 Exhaust Material

The exhaust system has to be made entirely out of steel, nickel or cobalt based alloy.

Between the cylinder head flange on the exhaust side and the turbocharger the geometry of the exhaust system is free.

No part of the design may be done in a way, that the composition of exhaust gases can change.

The following wall thicknesses are mandatory for exhaust containing components:

to turbocharger	min 1,15 mm
from turbocharger	min 0,80 mm

Table 35a

If the exhaust containing pipe is bent and if the resulting radius of the neutral axis is less than 200 mm, the actual wall thickness in the area of the radius may be below the mandatory minimum wall thickness (table 35a), provided the reduced wall thickness results exclusively from the material deformation during the bending process and/or the extension of the pipe ends on a maximum length of 50 mm.

Furthermore, and only in order to create exhaust gas compensators the minimum wall thickness may fall below the figures given by table 35a along a maximum pipe length of 40 mm.

It is permitted to cover the exhaust pipe with heat-protection materials, however the heat-protection material may not be considered for the determination of the wall thickness.

Any device or system which enables a variable geometry or position of components which are in contact with exhaust gases is forbidden.

The exhaust gases must not cross the plane Y=0 within the contour.

Any device (excepted waste gate) or system allowing a variable length or a variable cross-section in the exhaust system is forbidden.

FAS pass (Anti-lag system) is forbidden.

5.10.2 Exhaust exit

All exhaust gases must exit on the right-hand side of the vehicle in an area limited through:

x	x	z	z
1.350	1.600	275	425

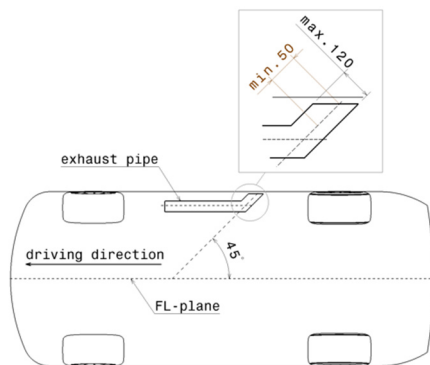
Table 37

For this purpose, the exhaust gases between the turbocharger and the exhaust outlet must be completely conducted through a pipe (exhaust tail pipe) which:

- has a maximum outer diameter of 120 mm,
- runs in parallel to plane z0 and at an angle of 45 degrees (± 5 degrees) to plane FL, over a distance of at least 50 mm (with reference to the pipe centre axis/ neutral axis (45°-line) and starting at the exhaust outlet),
- has no modification of the cross-section at any point of the aforementioned 50 mm (inside and/or outside).

If the outlet opening is completely situated above $z=275$ mm, no part of the outlet opening must be situated within the scaled contour and no part of the outlet opening must be situated at a distance of more than 25 mm (+5 mm) from the scaled contour.

After the passage through the outlet opening, the exhaust gas must flow diffusely.



Z64 – Position of the exhaust tail pipe and exhaust outlet opening

5.10.3 Change of geometry

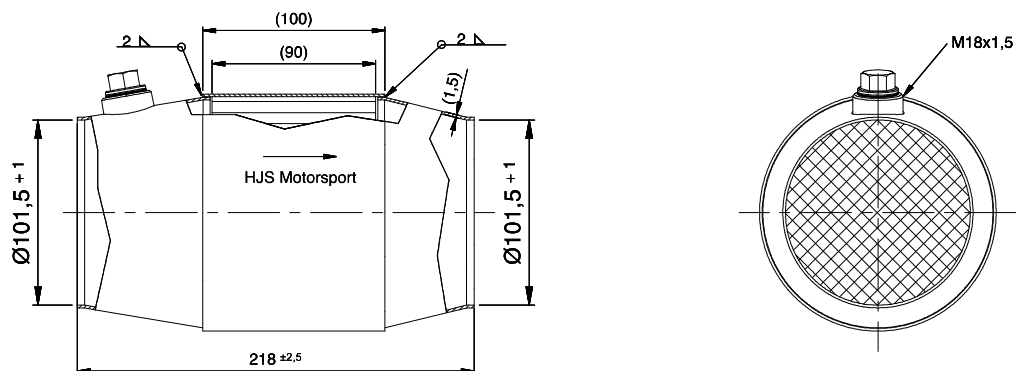
No part of the exhaust system may change its geometry while the vehicle is in motion.

5.10.4 protrude

No part of the exhaust system may protrude beyond the vertical projection of the car in plan view.

5.10.5 Emission/Catalytic converter

All exhaust gases must completely pass through that catalytic converter EB20-074.



Z65 – EB20-074 Catalytic converter

5.11 Fuel system/Mixture preparation

The rotational speed of the (HPFP) high pressure fuel pump (EB20-119 D or EB20-119 J) may not be more than 50 percent of the current crankshaft speed at any given moment. The HPFP must be driven mechanically only. Only the specified cam (see specification folder of EB20-119 D and EB20-119 J) may drive the piston of the HPFP.

a) At no point after (downstream of) the high-pressure fuel pump (EB20-119 D/EB20-119 J) may the pressure in a fuel containing component be more than 350 bar.

Exception for a):

The maximum fuel pressure may only be exceeded during periods in which the engine does not give off power.
The maximum duration of exceeded pressure is limited to 500 milliseconds.
The minimum period between two overpressures is 5 Seconds.
At no moment the pressure may exceed 400 bar.

b) At no point between fuel cell (EB20-018 D + EB20-018 J) and high-pressure fuel pump (EB20-119 D + EB20-119 J) may the pressure in a fuel containing component be more than 8 bar relative.

Exception for b):

The maximum fuel pressure may be exceeded by 1 bar for a 500 millisecond period.

5.12 Ignition system

The following specifications are mandatory together with the specifications given in article 8.

No more than one spark plug per cylinder with a minimum thread outer diameter of 9,5 mm is permitted.

No more than one ignition coil per cylinder is permitted
The use of other ignition components is prohibited.

The firing order of the four cylinders is free.

Any device to allow the ignition outside the combustion chamber is not permitted. Any kind of prechamber systems, either active or passive ones are not permitted. The ignition electrode of the spark plug must be open and uncovered adjoining to the combustion chamber or placed inside the combustion chamber

The assessment if components or accessories comply with these regulations is at the sole discretion of the DMSB Technical Delegate.

Any whatsoever covering of the spark plug parts facing the combustion chamber is forbidden.

Spark plugs are LB-parts

5.13 Engine cooling

The cooling of the engine is free, provided that the below prescriptions are respected:

5.13.1 Coolant pumps

Coolant pumps must be directly mounted to the engine and be driven purely mechanically by the engine.

5.13.2 Radiator

Radiators for engine coolant must be installed in front of plane VA and the only permitted net/core to be used for heat exchange is the one defined as SB component (SB20-007).

The radiator dimensions are part of the homologation. A new homologation of the radiator dimensions is permitted once per season. This new homologation of the radiator replaces the prior homologation which is then rendered invalid.

All heat transfers medium other than ambient air, water, oil, corrosion preventive and antifreeze are forbidden.

5.13.3 Coolant tank

Radiators and containers for coolants are considered to be independent components which must not form a part of the engine.

5.13.4 Thermostat

Coolant thermostats are permitted.

5.13.5 Variable air flow

Furthermore, all movable devices or systems capable of varying the air volume supplied to the radiators whilst the car is in motion are forbidden.

5.13.6 Expansion tank

A pressure accumulator in the cooling system with the sole purpose of serving as expansion chamber for the coolant is permitted. The expansion chamber must not be fitted inside the cockpit, inside the fuel compartment and/or inside the fuel box.

5.14 Engines lubrication system

Lubrication of the engine is free, provided that the below prescriptions 5.14.1 to 5.14.5 are respected:

5.14.1 Oil pumps

Engine oil pumps must be directly fitted to the engine and be driven by the engine purely mechanically.

5.14.2 Engine oil cooler

only air or water may be used as coolant.

5.14.3 Oil tank and Oil breather

The oil sump breather must be designed in such a way that it vents into an oil tank with a capacity of at least 3 litres. The oil tank system must vent to ambient. It is not permitted to lead gases and gas-oil mixtures into the engine air intake.

With the exception of the mechanically driven oil pump there may be no driven systems in lubrication containing components.

5.14.4 movable devices

All movable devices or systems capable of influencing the air volume supplied to the oil coolers whilst the car is in motion are forbidden.

5.14.5 pressure accumulator

Pressure accumulators in the lubrication system are forbidden.

5.15 Seals – Rings

The following components must have non-removable devices (clearance hole \varnothing max. 8.5 mm in one blind hole with M6, M7 or M8 thread in the other component), which allows for the sealing of the components (tightening in of the seal screw and fitting of the cover device) with each other:

- Valve and cylinder heads
- Cylinder heads and engine block
- Engine block and oil sump
- Camshaft timing cover and engine block
- Camshaft timing cover and cylinder heads

It is the competitor's responsibility to ensure that the above-mentioned components can be secured with the seals specified by the DMSB Technical Delegate so that it is not possible to separate the sealed components without destroying these seals.

Numbers of locations of the seals must be co-ordinated with the DMSB Technical Delegate in due time so that possible modifications may be made before the date of the homologation of the engine.

There must be no unsealed opening on the engines through which an engine part can theoretically be changed.

Replacing injectors (identical specification) or spark plugs (identical specification) are not seen as changing a part in the meaning of that article.

5.16 Sensors (see article 8.12)

5.17 Valve clearance check

In accordance with the sporting regulations valve clearance checks may be allowed even on sealed engines.

5.18 Torsional vibration absorber (LB20-117)

In derogation from article 19.10 it is permitted to mount torsional vibration absorber systems provided that: all parts forming the absorber are located between

x	x	y	y	z
-100	520	-220	220	<540

all rotating parts of the absorber are purely mechanical driven from the engine
the only purpose of any part of the absorber is to reduce torsional vibrations at the crankshaft and engine auxiliaries

No any part, between the two furthest apart crankshaft bearings, that is fixed to the crankshaft, may be defined as torsional vibration absorber or part of it.

5.19 Material specifications for engine and exhaust system components

These material specifications are applicable for the complete component, unless otherwise indicated.
Unless explicitly permitted for a specific application, the following materials may not be used anywhere on the engine:

- Metal Matrix Composites (MMC's).
- Intermetallic materials.
- Alloys containing more than 5% by weight of Iridium or Rhenium.
- Copper based alloys containing more than 2.75% Beryllium.
- Any other alloy class containing more than 0.25% Beryllium.
- Titanium and Titanium based alloys
- Ceramics and ceramic matrix composites.
- Beryllium
- boron alloyed aluminium (BORALYN)

For the avoidance of doubt, only if the material selection is listed as "free" in the following table, then the above list of prohibited materials is not valid with respect to that component only.

Where, more than one material is listed as an option for a component in the following table, then the component must either be made entirely from that material type or using multi-material assemblies that can only be affected by mechanical means unless specifically stipulated otherwise within these regulations.

	Part	material specification
1	Cylinder head cover (Cam cover) Cylinder head Cylinder block Cylinder liners Oil sump Pump housings Timing gear cover Rear cover	Iron- and/or Aluminium-alloys
2	Inlet valves	Titanium, Iron-, nickel- and/or cobalt-alloys
3	Exhaust valves	Iron-, nickel- and/or cobalt-alloys
4	Valve seat rings Valve guides	Iron and/or Copper based materials.
5	Friction bearing shells	Free
6	Plugs (crankshaft)	Free, including CFRP
7	Valve spring retainer Valve keepers	Titanium and/or iron alloys
8	Piston pin Crankshaft Camshafts Conrod Valve springs Gears	Iron alloys
9	Piston	Aluminium alloys
10	Bucket tappets	Free
11	Screws Nuts Fasteners	Iron-, titanium-, nickel- and/or cobalt-alloys
12	Screw plugs	Aluminium-, iron-, titanium-, nickel- and/or cobalt-alloys
13	Spark plugs and sensors	Free, including ceramic
14	Hydraulic & Electro-Mechanical Actuators	Free
15	Bushes & plain bearings	Free
16	Exhaust System	Iron, Nickel or Cobalt based Materials
	Coatings	
17	Piston and cylinder liners	Free, DLC (diamond like carbon) prohibited
18	Coatings up to a max. thickness of 0,8 mm	Free

Sintered metals as long as they do not contain any forbidden material, are allowed at any engine part (parts to be respected when the engine weight is checked).

6. Fuel systems

The parts specified in the below table are standard components:

Part specification	component number
fuell cell	EB20-018 D+J
fuell pumps	EB20-018 D+J
quick refuel valve	EB20-043 J

Table 34

The quick refuel valve (EB20-043 J) may only be installed if its use is expressly permitted in the sporting regulations.

The following requirements must be respected for the design of the fuel system:

Only the fuel cell (EB20-018 D+J), the catch tank, the fuel pumps and lines, the air/heat exchanger according to Article 6.6 as well as part of the fuel injection system may contain fuel.

The maximum interior diameter of fuel containing lines is 11 mm.

Exceptions to the interior diameter:

The feed line from the filling valve of the quick refuel valve (EB20-043 J) to the rubber bladder.

The fuel cell (EB20-018 D+J) must be used together with the foam baffling (identical in design, structure, material, weight and volume) with which it is homologated by the FIA.

It is permitted to connect the individual foam elements by means of cable ties and to secure them against shifting.

The fuel cell (EB20-018 D+J) must be marked with the name of the manufacturer of the fuel cell, the technical specifications and the date of manufacture of the bladder.

No fuel cell must be used more than 5 years after the date of manufacture marked on the fuel cell. An extension is only possible after an inspection by the manufacturer for a period of another 2 years. The competitor must submit a corresponding application together with an inspection certification to the DMSB.

The maximum permitted pressure in the fuel system is 8 bar.

The fuel pressure between the fuel cell and the injection valves may only be influenced by the two EB fuel pumps and a pressure valve.

6.1 Volume of all fuel containing components

The inner volume of all fuel containing components must not be more than 125 dm³ in total.

The inner volume of all fuel containing components which are situated outside the monocoque must not be more than 4 dm³ in total.

For the interpretation of this volume limitation, the connecting pipes between the fuel cell and the quick refuel valve unit (EB20-018 D+J and EB20-043 J) are not considered to be fuel containing components.

6.2 Fuel lines

All fuel containing lines must be made out of metal or, in the case of flexible lines, must have an outer abrasion and flame resistant (flame-retarding) braid as well as threaded connections. All fuel containing lines must have a minimum burst pressure of 70 bars at the maximum operating temperature of 135° C.

All fuel containing lines must be fitted in such a way that any leakage cannot result in fuel accumulating inside the Cockpit.

Fuel containing lines which are guided from the monocoque front wall to the engine (in both directions) must have FIA homologated cut-off valves.

All vent lines must be fitted with a gravity-activated roll-over valve cutting off these lines in the case of the car rolling. Tank ventilation lines must end outside the contour.

6.3 Defuel valve and quick connectors

Each car must be fitted with an FIA homologated dry break coupling (FIA Technical List No. 5) to be placed immediately in front of the rail of the injection nozzles allowing for the removal of fuel from the fuel system.

6.4 Quick refuel system (This article does only apply for races > 200km only)

If a quick refuel valve unit (EB20-043 J) is used, it must be completely located behind the rear bulkhead. The centre of refuelling valve unit must be located at $x=2.258$, $y<650$, $z=841,6$. The angle and direction of width is free. The centre of refuelling valve and vent valve must be on horizon.

To install the unit, it is permitted to modify the outside contour of the car. The only purpose of the modification must be to install the valve unit. The valve unit must be designed so that the centre points of the two valves have the same y-coordinate with a tolerance of ± 10 mm. The valves must furthermore be installed so that they do not protrude beyond the bodywork. The modification of the outside contour for the installation of the clutch unit must be completely located on the right side of the car above $z=750$ mm (tolerance -10 mm). The fuel containing lines between the quick refuel clutch unit and the fuel cell must be designed flexibly over a distance of at least 80 mm from the fuel cell and in the flexible area be protected by an outer abrasion and flame resistant (flame-retarding) braid.

Rigid parts of the fuel containing lines between the quick refuel clutch unit and the fuel cell must be made out of metal. Both line variants must have a minimum burst pressure of 70 bar at a temperature of 35° Celsius.

The provisions of Article 6.4 are equally applicable for a quick refuel clutch unit (EB20-043 J) if fitted to the left side of the car.

6.5 Pump switching

The fuel pumps must be switched so that they remain in operation for a duration of max. 30 seconds outside the starting procedure and/or when the engine is not running even when the ignition is not switched off.

6.6 Cooling

Any fuel cooling device is forbidden.

6.7 Pressure accumulators

Fuel lines are not seen as pressure accumulators. It is at the discretion of the DMSB Technical Delegate alone to decide what is a fuel line.

7. OIL AND COOLANT SYSTEMS

The components listed in the table below are standard or specification components.

Part specification	component number
Radiator net	SB20-007
Intercooler net	SB20-029

Table 35

Only the specified cooling core (SB20-007) may be used in radiators for the heat exchange between engine coolant (water) and air while only cooling core (SB20-029) may be used in radiators/intercoolers for the heat exchange between compressed combustion air and air. The used length and width of the SB20-007/029 components are free.

All substances for heat transfer/coolant other than ambient air, water, oil, corrosion preventive and antifreeze are forbidden.

7.1 Lubrication and coolant pumps

Engine oil pumps must be directly fitted to the engine and be driven by the engine purely mechanically.

Coolant pumps must be directly fitted to the engine and be driven by the engine purely mechanically.

7.2 Air ducts for cooling inside the race car

See Article 3.1.2.

7.3 Radiator installation specification

No part of the SB20 cooling core may be located behind $x=0$.

7.4 Lubrication and coolant lines

All lubricating oil lines must be made out of metal or, in the case of flexible lines, they must have an outer abrasion and flame resistant (flame-retarding) braid and they must have threaded connectors. All lubricating oil lines must have a minimum burst pressure of 70 bar at a temperature of 232° C.

Oil coolers are not seen as lubrication oil lines

All lines must be fitted in such a way that any leakage cannot result in any liquids accumulating inside the Cockpit.
Coolant thermostats are permitted.

7.5 Lubricant and coolant containers

Containers for engine oil must be designed as a separate and removable component.

The part defined with the engine homologation as oil tank/oil catch tank must:

have an inner, usable volume of at least 3 litres,

be provided with a fluid-level control device,

be completely located behind $x=400$ mm.

The oil sump breather must vent directly into the oil tank/ oil catch tank.

No part of the vehicle which contains lubricants must be at a distance greater than 600 mm from $y=0$ and behind $x=660$.

Exception:

Components containing gearbox lubricants may also be behind $x=660$.

The tubing of the crankcase ventilation may also be behind $x=660$.

No component containing lubricants may be located inside the Cockpit.

Exception:

The components of the power-assisted steering
The brake components
The clutch components

7.6 Gearbox oil cooler

See Art. 9.1a.

7.7 Pressure accumulator

The expansion container for the coolant is a specifically permitted pressure accumulator. There must be no more than one pressure accumulator in the coolant circuit. The accumulated pressure may only be used to compensate the coolant volume. The expansion chamber must not be fitted inside the Cockpit, inside the fuel compartment and/or inside the fuel box.

8. ELECTRICAL SYSTEMS

The parts listed in the table below are standard components.

Part specification	Component number
Starter	EB20-015
Engine control unit	EB20-022
The wiring loom in the monocoque	EB20-032
Alternator	EB20-014
Paddle shift compressor and valve block	EB20-016
Dashboard DDU	EB20-044
Windscreen wiper motor	EB20-013
Power control module	EB20-051
Gyro sensor (YAW)	EB20-050
ADR	EB20-033
Switch Panel	EB20-116
Tyre pressure monitoring system	EB20-117

Table 36

The parts listed in the below table are listed components.

Part specification	Component number
Master relays	LB20-003
Battery	LB20-005

Table 37

8.1 Battery

The only permitted batteries (LB20-005.1, LB20-005.2, LB20-005.3, LB20-005.4) are the ones listed in the DMSB technical list.

Only one battery with more than 1Ah is permitted in each race car.

Exception:

Batteries of the official inboard cameras and the ADR

The mounting points provided on the rear side the monocoque for this purpose must be used to fix the LB battery. The bracket for the battery is free on condition that the battery retained in the bracket and attached to the monocoque does not move by more than 3 mm (in any direction) when a force of 25 g is applied from whatever direction.

8.2 Starter

The driver must be able to operate the starter (EB20-015) when seated normally. The starter must be capable of starting the engine at any time using the electric energy of the battery stored on board.

8.3 Rear lights

Rear lights, indicators, rain light and brake lights must be in working order at all times.

As soon as the brake pedal is actuated, the brake lights on either side must flash continuously until the pedal is back in rest position. Any actuation of the brake lights, other than through the movement of the brake pedal, is prohibited.

The third stop light (central additional stop light), if fitted to the homologated base car, may be removed. Opening possibly resulting in the contour of the race car must be closed. This may however not result in a modification of the contour above the design line.

8.4 Number-plate lights

The number-plate lights may be removed. Possibly resulting openings in the contour of the vehicle must be closed. This may however not result in a modification of the contour above the design line.

8.5 Headlights

The headlights must at all times during an event be in working order. It is at the discretion of the DMSB Technical Delegate to evaluate if the light intensity is sufficient. The headlights (luminous elements and lamps) are part of the homologation and must be submitted to the DMSB as reference parts.

LED daytime running lights are permitted.

Movable luminous elements/headlights are forbidden.

8.6 Front/side indicator

Indicators must be in place at all times during an event and be in working order. It is at the discretion of the DMSB Technical Delegates to evaluate whether the light intensity is sufficient.

Indicators integrated in the front lighting unit of the homologated series production car must also be located in the front lighting unit on the race car.

Additional indicators outside the front lighting equipment, which are located above the design line, may be rendered inoperative and/or be removed. The resulting openings must be closed but the scaled contour must not be altered as a consequence.

8.7 Lighting devices/light intensity/LED for the rear lighting equipment

As an alternative to lighting devices complying with ECE standard, LED in working order may be used for the brake light, the rear light and the indicators. The manufacturing specifications listed in the table below are applicable for LED lights.

	Light intensity per LED	Minimum number	On surface
Each brake light	1.500 mpd	25	5.000 mm ²
Each indicator	1.50 0mpd	20	5.000 mm ²
Each rear light	1.500 mpd	70	10.000 mm ²

Table 38

Irrespective of the above table, the DMSB Technical Delegate may approve LED lights which differ from these specifications. LED lights with a corresponding special approval are part of the homologations and must be submitted to the [DMSB](#) as reference part.

A transmission factor of at least 60 percent is mandatory for the brake light glasses, the indicator glasses and the light glasses.

The third brake light (central additional brake light) is free.

The reversing lights must be rendered inoperative.

8.8 Warning light

The use of two blue luminous warning lamps is compulsory and must comply with the following prescriptions. The activated lights must emit a highly visible bright, bold blue light. It is at the sole discretion of the DMSB Technical Delegate to decide whether this requirement is met. One warning light each must be fitted to the following positions on the race car:

Front

On the inside of the windscreen, on the right side directly below the advertising sticker.

Rear

On the inside of the rear window, in central position in the lower area.

Alternatively, the standard third brake light may be modified so as to have the corresponding function of the registered warning light, in agreement and with the approval of the DMSB Technical Delegate.

The rear warning light must be activated by the engine control unit (EB20-022) when all three of the following conditions are met simultaneously:

1st gear engaged

Ignition switched on

Engine revs dropping from higher than 1.000 rpm to lower than 100 rpm.

Furthermore, it must be possible for the driver to switch on the front and the rear warning lamp manually in the case of any starting problems.

The switch for the manual warning lamp actuation must not be situated on the steering wheel and it must be an on/off switch which has no other functions.

8.9 Pit stop lights

In the area of the right and left rear side windows, one (1) signalling light each must be installed and comply with the following provisions:

The shape of the signalling light must be of circular shape and must have a minimum diameter of 50 mm. The signalling light must be made out of the minimum of 17 orange LED.

The light emitting diodes (LED) of the signalling light must be located between 10 mm and 15 mm from the interior of the rear side windows and have an opaque cover in x- and in z-direction towards the window. The signalling light must be completely above z=750 mm. The right and left signalling light must be connected in parallel.

For each of the two electrical circuits, there must be two separate switches or alternatively one step switch with separate electrical circuits, outside and inside the car.

The series production bodywork contour may be locally modified in a maximum diameter of 60 mm, also above z=275 mm, to accommodate the exterior switch,

The switch or switches situated inside the car must be installed so that the driver, when seated normally, is able to operate them. None of these switches must be situated on the steering wheel.

8.10 Switches

Lamps must always be used for the purpose which results from its designation and always be activated by the correspondingly defined switches.

The car may be equipped with one map switch only. A maximum of four different mappings/map matrixes may be activated/deactivated by the map switch as long as the related requirements out of the DTM Sporting Regulations are respected at any time.

8.10.1 Position/DRS display

The position/DRS display (Display EB20-090) must be installed on the inside of the side windows behind X = 1.800 (left- and right-hand side) with the shortest distance possible to the homologated contour and must be completely visible in side view. The display must be operational and wired electrically according to the provisions in the specification sheet during qualifying and races.

8.11 Cables/wiring loom

The electrical connections between the following components must always be made through the cables and comply with the wiring diagram of the standard wiring loom (EB20-032).

- ECU –Engine Control Unit (EB20-022)
- DDU Dashboard Display Unit (EB20-044)
- Power module (EB20-051)
- ADR-Accident Data Recorder (EB20-033)
- Windscreen wiper motor (EB20-013)
- Fuel pump connector on the tank (EB20-018 D+J)

- Throttle sensor
- Emergency off switch
- Fire extinguisher trigger switch

The electrical connections between the standard wiring loom (EB20-032) and the following components must always be made through cables which have an electrical connection to only one of the specified components.

Compressor paddle shift (EB20-016)
 Radio
 Main relays (LB20-003)
 Starter (EB20-015)
 Driver drinking water pump
 Pumps for the cooling of the brakes
 Fire extinguisher/fire extinguisher control unit
 Power steering pump (EB20-048)
 Lap trigger (EB20-058)
 Pit stop lamps and switches
 Headlights
 Taillights
 Steering wheel
 Transponder for official timekeeping
 Incident camera (EB20-029)

Exception:

Earth and positive cables may have a conductive connection to several of the specified components.

Any cable and electrical connection which is not part of the standard wiring loom and which is connected to a sensor or actuator must be submitted to the DMSB in form of a drawing during the basic inspection of the race car. This drawing must also show all connector types and locations. Any modification of the submitted cable and connectors must be previously approved by the DMSB Technical Delegate.

8.12 Permitted sensors

In addition to the sensors which are part of an EB component, only the following sensors are permitted for the car.

	Sensors	max Number
S1	Engine Exhaust gas temperature sensor	2
S2	Engine Intake pressure sensor	3
S3	Engine Intake temperature sensor	3
S4	Engine Crankshaft speed	2
S5	Brake pressure rear sensor	1
S6	Brake pressure front sensor	1
S7	Cockpit temperature sensor	1
S8	tbn	
S9	Wheel travel sensor	4
S10	Gear identification potentiometer (EB20-016)	1
S11	Throttle pedal way sensor	1
S12	Gearbox oil pressure sensor	1
S13	Gearbox oil temperature sensor	1
S14	Engine Knock sensor (structure-borne type only)	4
S15	Engine Fuel pressure sensor	2
S16	Engine Fuel temperature sensor	2
S17	Clutch pressure sensor	1
S18	Engine Crankshaft housing pressure sensor	2
S19	Engine Lambda probe	1
S20	Steering angle sensor	1

S21	Engine speed sensor	2
S22	Engine oil pressure sensor	2
S23	Engine oil temperature sensor	3
S24	Engine water pressure sensor	1
S25	Engine water temperature sensor	2
S26	Pneumatic temperature sensor (EB20-016)	1
S27	Pneumatic pressure sensor (EB20-016)	1
S28	Wheel speed sensor front axle	2
S29	Tire pressure sensor (EB20-117)	4
S30	Lap time signal receiver (Lap trigger) (EB20-058)	1
S31	Engine Sensor for throttle valve adjustment	2
S32	Engine Sensor for cylinder 1 detection	1
S33	Steering oil pressure sensor	1
S34	Steering oil temperature sensor	1
S35	yaw-Rate (incl. Longitudinal and lateral acceleration) Sensor (EB20-050)	1
S36	DRS Sensor	1
S37	Engine Turbo charger speed sensor	1
S38	Fuel flow restrictor (EB Sensor)	1
S38.1	Push-to-Pass Fuel flow restrictor (EB Sensor)	1
S39	Pressure switch of Air Conditioner	1
S40	Temperature sensor of Air Conditioner	1

Table 39

The permitted sensors must always be used for the acquisition of data in relation to the operating state of the car. Any measure or device capable of modifying the output signal of a sensor so that an output signal deviating from the actual operating state can be produced is prohibited whilst the car is in motion. The sensors must always be used for the purpose resulting from the wording of the corresponding sensor, for example the engine oil pressure sensor must always be used for the acquisition of the engine oil pressure. It is at the discretion of the DMSB Technical Delegate to evaluate the eligibility of a sensor and its use in compliance with these regulations.

The measuring points of the eligible sensors for the intake air must be located in the intake system behind the air restrictors and in front of the throttle valves.

The permitted sensors for the acquisition of the wheel speeds may only measure the rotational speed of the wheels at the front axle.

No whatsoever information/data coming from a sensor out of Table 39 may be transmitted/transported to whatever place/unit/human outside the Paddock of the relevant event until the start of the last DTM race of the weekend.

8.12.1 Mandatory sensors

The sensor for the acquisition of the Cockpit temperature is mandatory and must be fitted to the outer right face of the headrest, seen in driving direction.

8.12.2 Prohibited sensors

The use of the following sensors is prohibited:

- Gyroscopic sensors
- Combustion-chamber pressure sensors
- Laser sensors
- Force measuring sensors
- Torque sensors

Exceptions:

The yaw-rate sensor EB20-050 is explicitly permitted.

The ADR (EB20-033) sensors are explicitly permitted

The torque Sensor of Torque sensing system (EB20-003.1) is explicitly permitted.

8.13 Program and data status

The housing of the engine control unit, the DDU, the power control module and the gearbox control unit will be sealed by the DMSB Technical Delegate or his representative against unauthorized opening. It is the participants' responsibility to see that the seals remain intact. Any participation in a DTM Event with damaged or missing seal is prohibited.

The software version released by the designated supplier and recognized by the DMSB must under no circumstances be modified, by whatever method.

Solely the standard wiring loom (EB20-032) may be connected to the engine control unit. Any other electrical connection to the engine control unit is prohibited.

The following conditions for the software of standard components must be respected:

Component	Program version	Data status
EB20-044 DDU	No modification to the version stored at the DMSB permitted.	May be individually modified/applied with the authorized tools. Exception: Sensors and period according to 8.12.1
EB20-022 ECU	No modification to the version stored at the DMSB permitted.	May be individually modified/applied with the authorized tools.
EB20-051 PCM	No modification to the version stored at the DMSB permitted.	The current values of the exits specified in the table „Powerbox-Application“ (see DMSB server, „Mandatory Regulation Data Files, subfolder EB20-051) may be individually modified/applied. The modified/applied version must be registered with the DMSB Technical Delegate before it is used at a DTM event. The function defined in the table „Powerbox-Application“ and the allocation of exits and inlets also fixed in the same table must not be modified.

Table 72

For a gear change, it is permitted to take temporary effect on the engine performance not only through the throttle position but also through the software of the ECU (EB20-022). The signal for the beginning of such an effect through the ECU must always be released through the actuation of the rocker switch of the paddle shift system. The effect must end after 250 milliseconds at the latest.

Furthermore, the ECU may only use parameters other than the throttle pedal position for taking effect on the engine performance if at least one of the following provisions is met:

The pit speed limiter is activated in the pit lane.

The engine is started.

The maximum engine speed individually defined by the competitor is achieved. (Solely the maximum speed may be stored).

The start limitation as stored in the program version is activated.

Furthermore, it is permitted that the ECU takes effect on the engine performance by means of values collected by the permitted sensors for:

- Air pressure
- Oil pressure
- Oil temperature
- Water temperature
- Intake air temperature
- Intake air pressure
- Knocking (S14)
- Airbox light (S4)
- Turbo speed
- any speed limit that is officially monitored by marshalling system
- position of map switch

Under no circumstances, by any means howsoever, is it permitted to determine the speed difference between the front and the rear wheels.

The ECU inputs may only be used for the purpose which results from literal sense of its specification. At the input for the oil pressure, only the signal of the oil pressure sensor (S21) may thus for example be connected.

8.14 Timing transponder

For the duration of a DTM event the official timing transponder supplied from the organizer must be installed like defined by the organizer and must be in working order at any moment during the event.

Furthermore, the transponder must:

be securely mounted to the vehicle and must have no opportunity to move with respect to the coordinate system of the vehicle;

be located on the left side of the vehicle between $x=20$ and $x=-140$ (only applies to parts within the red contour as shown in drawing Z77);

be located entirely below $z=200$;

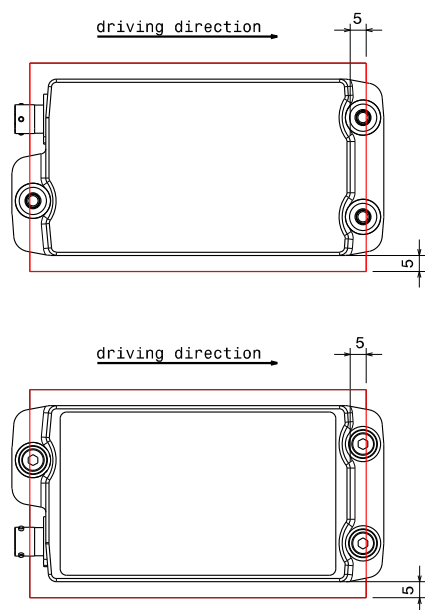
be mounted so that the cable outlet is directed towards the rear of the vehicle;

be mounted so that over the entire height of the transponder a min. 5mm wide gap is formed all the way around (see drawing Z77, red boundary) in which no part may be located with the exception of the cable outlet. Any gap filling measure is prohibited.

Be mounted so that in bottom view a display according to the red outline shown in drawing Z77 is visible.

If instructed by the DMSB the competitors can be obligated to install additional timing transponders or other devices ready for operation used to determine lap times, to monitor the speed limit in the pit lane, to detect a false start and to measure pit stop times.

The event organizer may ask to use a different transponder than the one shown by Z77



Z77 – Contour (red) of the mandatory gap between parts of the vehicle and the transponder

8.15 Dashboard/display (DDU)

The display is a standard component (EB20-044). No display/monitor other than the display/monitor of the DDU may be in the race car.

Exception:

Display of rear-view camera (LB20-030)

The software version released by the designated supplier and recognized by the DMSB may in no case be modified, by whatever means.

The housing of the DDU will be sealed by the DMSB Technical Delegates or his representative against unauthorized opening. It is the participants' responsibility to see that the seals remain intact. Any participation in a DTM event with damaged or missing seal is prohibited.

Solely the standard wiring loom (EB20-032) may be connected to the DDU.

Operating data and driving conditions of the car may only be transmitted to the driver by means of the DDU and the display of the rear view camera.

Exception:

During races only:

It is forbidden to show any lap time based calculations and information on the display except the lap time of the last lap. It is forbidden to transmit any information that is generated by the tyre pressures measurement system (LB17-008) to the driver (neither pressures nor temperatures) except in case the pressure of at least one tyre is below the mandatory minimum. Then the pressure of all four tyres may be displayed as long as the pressure of at least one tyre is below the mandatory minimum pressure.

Any visual or acoustic "car-to-driver" information, other than the ones transmitted through DDU and or the back view camera display, to the driver is prohibited.

8.16 Energized systems and/or components

With the exception of the eligible standard components, there must be no energized system and/or component which are capable of taking effect on the engine or the handling of the race car in any kind inside the vehicle.

8.17 Data storage and transmission

Any wireless transmission of vehicle data is prohibited. There must be no system inside or on the vehicle which is capable of transmitting data wirelessly.

Exceptions:

Radio system

Marshalling system EB20-034

Signal of the official inboard cameras

Tyre pressure monitoring system (EB20-117). The signals of the system may only be received inside the car.

8.18 Electric motors

Only the following electric motors are permitted in the vehicle:

- One (1) starter (EB20-015)
- One (1) windscreen wiper motor (EB20-013)
- The fuel pumps (EB20-018 D+J)
- The drinking water pump provided that the pump and all lines connected to it are located completely inside the Cockpit.
- One (1) pump for the power-steering (EB20-048)
- One (1) fluid pump for the windscreen washer system
- The maximum of two motors with a maximum permitted power consumption of 200 Watt each with the sole purpose of operating the cooling devices for the driver and which must be installed entirely inside the Cockpit. The motor must be listed component (LB). The use of any of those engines is only allowed if the race distance is < 300km.
- The maximum of two (2) fluid pumps for the water spray system of the brake system
- The E-Gas actuator (LB20-028)
- The compressor paddle shift system (LB20-015)

Fluid pumps may not be cooled by air.

Exception:

The servo pump (EB20-048)

8.19 Windscreen wipers

The windscreen wiper motor is a standard component (EB20-013). No part of the windscreen wiper motor must be below $z=400$ mm.

All other components which are required for a correct operation of the windscreen wiper are free on condition that the provisions of these regulations are respected.

The windscreen wiper must be in working order at all times during an event. It must clear the screen in the complete area in front of the driver over a surface of at least $500,000$ mm².

It is permitted to install a system that allows spraying water onto the front windscreen whilst the car is in motion. The maximum permitted inner volume of all water carrying components of this system is 1500 cm³. All water carrying components of this system must be located between $x=535$ and $x=735$.

8.20 Accident data recorder (ADR – EB20-033)

The accident data recorder (ADR) homologated by the FIA must be used in each car at all times during a DTM Event when the DTM car is in motion and in compliance with the instruction manual. The channels described in the ADR specification sheet of the data acquisition must be made available to the ADR through a CAN-interface.

A medical light operated by the ADR must be installed.

8.21 Alternator (EB20-014)

The alternator is a standard component. The pulley of the alternator is free provided that no other function results from its shape and design other than to drive the shaft of the alternator and to reroute the direction of movement of one (1) belt.

8.22 Power Control Module (EB20-051)

The power module is a standard component (EB20-051). It is permitted to modify the data versions of the module individually on condition that the provisions of 8.13 are respected.

8.23 Material and weight specifications for energized systems and/or components

These material specifications are applicable for the complete component, unless otherwise indicated. If several materials are permitted, the corresponding component must nevertheless be made out of one single material only. If not otherwise indicated, beryllium, ceramic materials, titan, sintered materials, beryllium and boron alloyed aluminium (BORALYN) are prohibited, even if the material specification states “free”.

	Material specification
Boards for electrical components	Free, including CFRP

9 Gearbox, clutch and drive train

The parts specified in the below table are standard (EB) or list (LB) components relevant for this article.

Component	Number
Gearbox	EB20-003
Torque Sensing System	EB20-003.1
Bellhouse	EB20-004
Clutch	EB20-005
Propshaft	LB20-033
Paddle-Shift System	EB20-016
Drive Shaft	EB20-009
Wheel bearing	EB20-024
Gearbox oil cooler	LB20-014/014.1/014.2
Flex Disc	LB20-031

Table 41

The two wheels of the rear axle must be driven.

Any control of a possible difference in wheel speeds is prohibited.

Exception:

Wheel speed differences between the two driven rear wheels may be controlled by means of the eligible differential. The eligible differential is part of the standard component (EB20-003).

Any device or measure which is capable of transmitting torque between the wheels of the front axle is forbidden.

Active systems in the drive train are prohibited.

9.1 Gearbox

Solely the following gearbox ratios are permitted (the figures specified define the number of teeth):

driving: driven wheel

1 st gear	2 nd gear	3 rd gear	4 th gear	5 th gear	6 th gear
14 : 32	16 : 28	19 : 27	20 : 24	20 : 21	26 : 24

Table 42

Solely the following Reduction gears/drop gears ratios are permitted (the figures specified define the number of teeth):

(driving: driven wheel):

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
15:26	18:30	16:26	19:30	19:29	17:25	18:26	20:28	19:26	19:25	22:28

Table 43

Solely the following differential ratios are permitted (the figures specified define the number of teeth):

bevel gear	crown wheel
10	31

Table 44

The ramp angle with 45/65 degrees stored in the data set of the EB20-003 component must always be used in each differential. The installation position of the ramp at the mandatory location is at the discretion of the competitor.

The reverse gear must be in working order at all times during an event. The driver must be able to select the reverse gear when seated normally.

In addition, all the friction plates, steel plates and disc springs specified in the drawing version must be in the differential at all times during the event, completely and as submitted in the description of the standard component. The order (pairing) of steel plates and friction plates in the differential case is free.

Each gear change must be made through the normal operation and function of the paddle-shift system (EB20-016).

Any other method or design to support the gear change is prohibited.

Whilst the car is in forward motion, a modification of the transmission ratio between the crankshaft and the driven wheels must always be made in the EB gearbox differential unit, and there only through the eligible 6 ratios.

Any other mechanical, electrical, hydraulic or pneumatic device capable of having an effect on the transmission is prohibited.

The composition of the gearbox oil is free.

The attachment of the rear towing band on the standard component gearbox is explicitly permitted and prescribed. The attachment of the anti-roll bar (EB20-053.100) for the rear suspension on the gearbox (drop gear cover) is explicitly permitted.

9.2 Gearbox oil cooler

The gearbox oil cooler (LB20-014, 014.1, 14.2) is a list component which must be mounted behind $x = 2.300$ mm.

The gearbox oil cooler must be connected in such a way that the entire oil that is delivered by the gearbox oil pump (component of EB20-003) flows through the oil cooler.

9.3 Clutch

The clutch is an EB20 component (EB20-005).

The clutch must be activated by one of the driver's feet only by means of a pedal. Any other method to affect the contact pressure of the clutch friction discs is prohibited.

Exception:

It is permitted to use a pre-pressure valve (LB20-010) in the hydraulic pressure pipe leading to the clutch cylinder.

The following applies for the operation by means of a pedal:

The pedal movement from the clutch cylinder of the pedal block to the clutch release cylinder must be transmitted hydraulically.

It is mandatory to fit the clutch control system with a device which allows the clutch to be jammed when disengaged, even in the event that the circuit breaker is engaged (electrical circuit disrupted).

This jamming must be affected by means of a shut-off valve (LB20-010) included on the DMSB technical list. For the interpretation of these regulations, this device is not considered to be a pressure accumulator. This device must have no other function than the one described above (jamming). The driver must be able to activate this device when normally seated in the car.

A documentation of the operating procedure must be submitted to the DMSB for approval.

9.4 Paddle shift

Shape and material of the finger rest of the shift buttons are free.

The compressor of the paddle shift system is a list component (LB20-015)

9.5 Paddle shift control unit (GCU)

The data and program version of the gearbox control unit is part of EB20-022. Any individual modification is prohibited.

9.6 Drive shafts

EB20-009

9.7 Prop shaft

LB20-033

To connect the propshaft with the bellhous placed flywheel only the components flex disc (LB20-031) and propshaft flange (SB20-012) may be used.

9.8 Wheel bearing

EB20-024

10 Suspension and steering

The parts specified in the below table are standard components relevant for this article.

Part specification	Component number
Steering	EB20-008
Steering servo pump	EB20-048
Steering column	EB20-057
Steering wheel quick	EB20-047
Front dampers	EB20-030
Rear dampers	EB20-031
Clutch housing	EB20-004
Paddle shift system	EB20-016
Drive shaft	EB20-009
Wheel bearing	EB20-024

Table 45

Components of the suspension may not contain any liquid or gaseous substances.

Exception:

Air in tube materials
Water that has penetrated through atmospheric influences.

10.1 Suspension:

The suspension of the front axle is an EB20 component (EB20-052).
The pivot and attachment points (U1, U3, O1, O3, S1) must be located entirely inside the areas defined below (10.2).

The suspension of the rear axle is an EB20 component (EB20-053).

The pivot and attachment points (U1, U3, O1, O3, S1) must be located entirely inside the areas defined below (10.2, table 47 and 48).

Only parts which are described in shape and material and whose use is expressly permitted may influence the movement (direction, speed, displacement) of EB20-052 or EB20-053 components.

10.2 Areas for suspension pivot points

The pivot points U1, U3, O1, O3 and/or S1 of the EB20 suspension components may only be located inside the defined in the table 47 and 48. The volume results from the distance between the base and top surfaces. The assignment of component to the respective volume given in the tables below is binding.

In any case the four centre lines of the holes for the EB20 suspension attachment (pick up points) must be identical to the four centre lines of suspension attachment holes which are located directly under the surface of the relevant volume.

Outside of these volumes no other suspension components or other parts which are moved by the compression or rebound of the suspension may be attached or have a pivot point.

Exceptions:

O2, U2, S2, PR2

EB parts provided that a position of an attachment point and/or pivot point is defined in the relevant specification sheet outside the volumes.

Brake lines*

Water lines for brake cooling*

Electrical lines for wheel speed sensors*

Sealing collar for feedthrough parts*

*provided that the listed components fulfil no other function other than the one resulting from the literal sense of the component description.

1 – FS 01 front suspension, upper wishbone front				
		X	Y	Z
Base surface	P1	-136	-368	352
	P2	-84	-368	352
	P3	-84	-368	308
	P4	-136	-368	308
Top surface	P1	-136	-418	352
	P2	-84	-418	352
	P3	-84	-418	308
	P4	-136	-418	308
FS 02	Wheel carrier			

2 – RS 01 rear suspension, upper wishbone front				
		X	Y	Z
Base surface	P1	2.440,634	-199,841	387
	P2	2.489,498	-182,056	387
	P3	2.489,489	-182,056	323
	P4	2.440,634	-199,841	323
Top surface	P1	2.457,735	-246,825	387
	P2	2.506,599	-229,04	387
	P3	2.506,599	-229,04	323
	P4	2.457,735	-246,825	323
RS 02	Wheel carrier			

3 – FS 03 front suspension, upper wishbone rear				
		x	y	z
Base surface	P1	455	-333	312
	P2	455	-409	312
	P3	455	-409	248
	P4	455	-333	248
Top surface	P1	405	-333	312
	P2	405	-409	312
	P3	405	-409	248
	P4	405	-333	248

4 – RS 03 rear suspension, upper wishbone rear and RS S1 tie rod				
		x	y	z
Base surface	P1	2.927,5	-169	387
	P2	3.016	-169	387
	P3	3.016	-169	343
	P4	2.927,5	-169	343
Top surface	P1	2.927,5	-219	387
	P2	3.016	-219	387
	P3	3.016	-219	343
	P4	2.927,5	-219	343

5 – FS U1 front suspension, lower wishbone front				
		x	y	z
Base surface	P1	-148	-190	102
	P2	-96	-190	102
	P3	-96	-190	58
	P4	148	-190	58
Top surface	P1	-148	-240	102
	P2	-96	-240	102
	P3	-96	-240	58
	P4	-148	-240	58

VA U2 Wheel carrier

6 – RS U1 rear suspension, lower wishbone front				
		x	y	z
Base surface	P1	2.438,386	-200,659	252
	P2	2.487,25	-182,874	252
	P3	2.487,25	-182,874	188
	P4	2.438,386	-200,659	188
Top surface	P1	2.455,487	-247,644	252
	P2	2.504,351	-229,859	252
	P3	2.504,351	-229,859	188
	P4	2.455,487	-247,644	188

HA U2 Wheel carrier

7 – FS U3 front suspension, lower wishbone rear				
		x	y	z
Base surface	P1	455	-279	202
	P2	455	-393	202
	P3	455	-393	118
	P4	455	-279	118
Top surface	P1	405	-279	202
	P2	405	-393	202
	P3	405	-393	118
	P4	405	-279	118

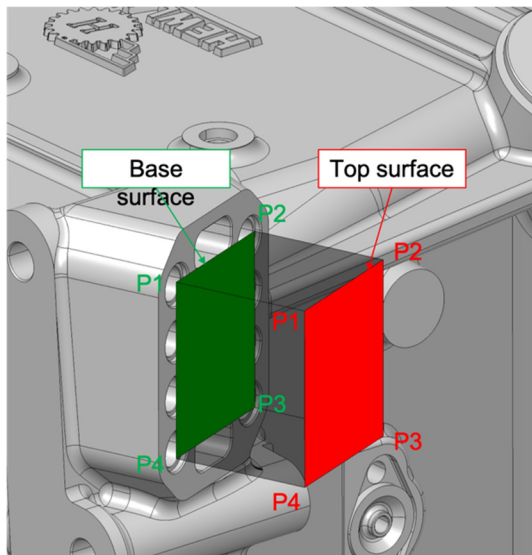
8 – RS U3 rear suspension, lower wishbone rear				
		x	y	z
Base surface	P1	2.964	-146	202
	P2	3.016	-146	202
	P3	3.016	-146	158
	P4	2.964	-146	158
Top surface	P1	2.964	-196	202
	P2	3.016	-196	202
	P3	3.016	-196	158
	P4	2.964	-196	158

9 – RS S1				
		x	y	z
Base surface	P1	2.964	-146	277
	P2	3.016	-146	277
	P3	3.016	-146	233
	P4	2.964	-146	233
Top surface	P1	2.964	-196	277
	P2	3.016	-196	277
	P3	3.016	-196	233
	P4	2.964	-196	233

Tabelle 48

The Y figures in this table are equally applicable on both sides of the vehicle.

The bearings attached in the three areas of a wishbone (e.g. VA O1, VA O2 and VA O3) must respectively be connected with each other through a wishbone.



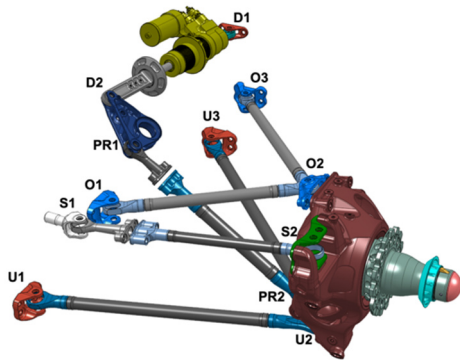
Z32 – Schematic display of permitted areas for pivot points

10.2a Distance between pivot points

The distance between the pivot points A + B defined in table 73 may not vary when the vehicle is in motion.

Pivot point	A	B
	O1	O2
	O3	O2
	U1	U2
	U3	U2
	S1	S2
	PR1	PR2
	PR1	D2

Table 73



Z67 Diagram of the fixation points and pivot points and their position

10.2b Relative motion between suspension points

No relative motion is permitted between the points O2, U2, PR2 and S2 and the wheel carrier when the car is in motion.

No relative motion is permitted between the points O1, O3, U1, U3 and D1 at the front axle and the monocoque when the car is in motion.

No relative motion is permitted between the points O1, O3, U1, U3, S1 and D1 at the rear axle and the monocoque when the car is in motion.

No component used to attach or adjust parts of the suspension may be executed in such a way as to modify the distance between the pivot points of a component in any way possible by whatever means whilst the car is in motion.

For the purpose of article 10.2a and 10.2b the car is also considered to be in motion during the entirety of a pit stop for which the car stops for less than 10 seconds in front of its designated pit. Possible penalty times are not considered for the determination of the time.

Only the following components may have a connection with the wheel carriers as well as with other vehicle parts:

- Pushrod (EB20-052.19/20, EB20-053.19/20) to the rocker (EB20-052.21, EB20-053.21)
- Brake cooling air duct (EB20-091/092)
- Brake water cooling (EB20-094)
- Brake fluid pipe
- Wheel speed sensor wiring
- Drive shafts (EB20-009)
- Whish bones (EB20-052.10/11/12, EB20-053.10/11)
- Tie rods (EB20-052.13/14, EB20-053.13/14)

10.3 Suspension clearance

It must be possible to move the completely fitted suspension upwards by at least 30 millimetres when applying a force of maximum 350 Newton, measured at the exterior end of the corresponding wheel-hub, when the suspension is relieved, the wheel and the suspension springs and dampers removed and the anti-roll bar detached.

No fixation or pivot point on the vehicle side must change its position in relation to the monocoque when the car is in motion.

Exception:

Point S1, exclusively on the front axle (see Z67)

Point PR1 (see Z67)

Point D2 (see Z67)

O2, U2, S2, PR2

With the exception of mechanical movements of EB20 suspension parts (EB20-052 and EB20-053) resulting from the driving dynamics any device or measure which is capable of affecting the ground clearance, the dampers, the spring characteristic and/or its preload whilst the car is in motion is forbidden on the vehicle,

Any device or measure that is capable of limiting or extending the suspension travel and/or effecting the resistance is prohibited.

Exception:

The resistance provided by the suspension springs in line with the regulations
Resistance resulting from the use of EB20 components in line with the regulations
Components define in article 10.5.1 and 10.5.2

The assessment if a device or measure complies with these provisions is at the sole discretion of the DMSB Technical Delegate.

Any system using the driving dynamics (accelerations) in order to temporarily or permanently limit the free movement or resist the movement of the dampers and/or suspension springs is also prohibited.

10.4 Springs

The use of steel coil springs with linear characteristic is mandatory. The coil springs have to be installed in a manner so that the piston rod of the dampers (EB20-030 and/or EB20-031) runs inside the coil spring, parallel to the suspension travel and may not be in contact with any other part of the vehicle with the exception of the damper (EB20-030/031) and, if applicable, the permitted centring ring (LB20-027).

A maximum of two steel made coil springs (each made out of steel) may be installed per damper, provided that the same damper piston rod is located inside both springs.

If two springs are installed simultaneously on one damper, one of these springs must be the list component "helper spring" (LB20-026). The following applies for the helper springs:

A maximum of one spring may be listed as a LB-part per manufacturer

The maximum spring rate is 25 N/mm

Other spring elements or components which have or could have an effect on the movement (speed, travel, etc.) of the piston rod which are not expressly permitted are prohibited.

Any measure which allows altering the preload of the springs without having to removing the front and/or rear bodywork is prohibited.

10.5 Dampers

The dampers are EB20 components (EB20-030 = front damper, EB20-031 = rear damper). 4 dampers are mandatory in the vehicle (2x EB20-030 at the front axle, 2x EB20-031 at the rear axle).

The damper oil is part of the EB20 component.

One damper must be mounted for each wheel. The relative movement between damper housing and piston rod must be activated through the movements of one rocker (EB20-052.21/EB20-053.21) (per damper) only.

All parts of a rocker must rotate solely around the bearing axis of the bearing of the EB20 component.

The bearing for the rockers at the front axle (part of EB20-052.21) must be mounted according to drawing Z95 to the frame (EB20-002/EB20-002 D), the bearing for the rockers at the rear axle (EB20-053.21) according to drawing Z94 to the gear box (EB20-003).

Solely the relative movement between damper housing and piston rod may affect the damper when the car is in motion. Any not expressly permitted measure which limits the travel of the piston rod and/or reduces the stroke speed of the piston rod is prohibited.

No component of a damper may change and/or move as a consequence of the longitudinal and/or transverse acceleration of the vehicle.

Exceptions:

piston stroke
movement of internal valves

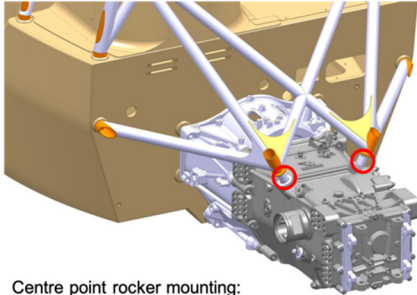
Each wheel must and may activate only one single EB20 shock absorber with its movement. The activation may only occur through the movement of the rocker (EB20-052.21 front/EB20-053.21 rear).

It is permitted to individually change the damper characteristic at all times during an event whilst the vehicle is standing still provided that the adjustment is exclusively made by turning the adjustment valves mounted to the outside of the damper as provided for by the manufacturer.

It is permitted to mount one spring travel sensor per damper.

The needle bearing (EB20-065) and the corresponding washers must be placed around the piston rod.

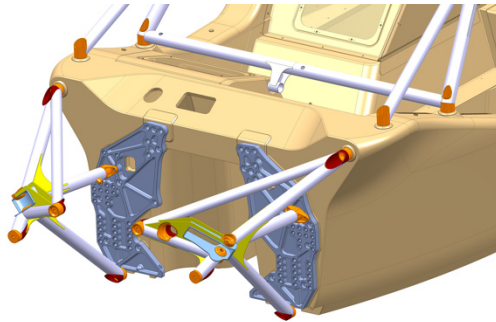
If two springs are mounted on a damper one (1) centring ring (LB20-027) made out of aluminium according to drawing Z124 must be installed between the two springs. A maximum of one centring ring may be listed as a LB-part per manufacturer. If only one spring is mounted on a damper the centring ring may not be installed.



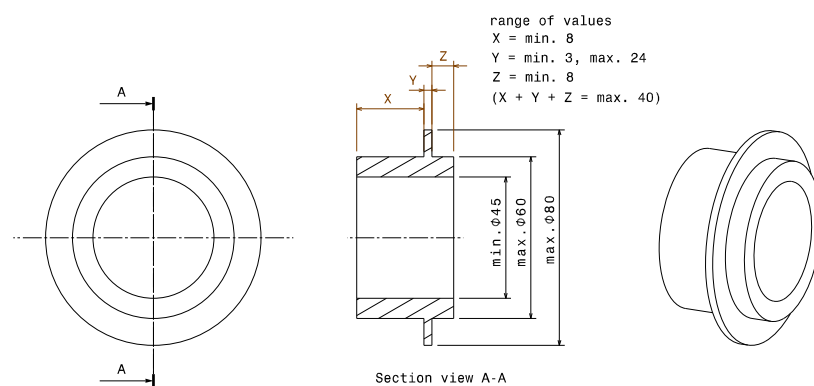
Centre point rocker mounting:

X = 2670
Y = ±145
Z = 400

Z94 – Sole permitted mounting position for the rocker at the rear axle



Z95 – Sole permitted mounting position for the rocker at the front axle



Z124 – Binding dimensions for the centering ring (LB20-027)

10.5.1 Inner sleeve

It is permitted to place one (1) individual cylindrical sleeve around the piston rod as stroke limitation inside the damper housing. The sealing of the damper must not be damaged as a consequence.

The following provisions apply for the sleeve:

Inner diameter: 14,5mm, tolerance ± 0.5 mm

Outer diameter: 22,0 mm, tolerance ± 0.2 mm

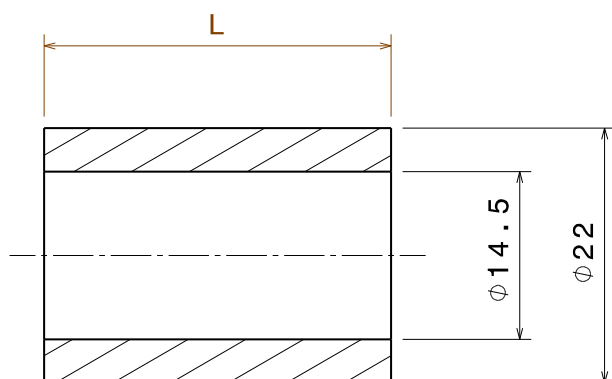
Material: POM with a density between 1,40 and 1,45 kg/dm³

No more than one sleeve may be fitted per damper.

For the 2019 season, two heights of the sleeve are permitted for each make (dimension L in drawing Z83).

Before the beginning of the event at which the sleeves shall be used for the first time in a car of a make, the DMSB Technical Delegate must be informed in writing which of the two sleeves shall be used in the dampers of the front axle and which ones in the dampers of the rear axle.

Any change to any vehicle of the respective manufacturer in the height or in the allocation (front/rear) once this information is submitted is prohibited. It is however permitted to use the damper without sleeves.



Z83 – Inner sleeve for damper stroke limitation

10.5.2 Outer sleeve

It is permitted to install one (1) cylindrical sleeve around the piston rod as a stroke limitation outside the damper housing. The length of the sleeve may be defined individually for each manufacturer. Only one sleeve is permitted per manufacturer and vehicle axle (front/rear). The sleeves must be homologated.

The sleeves for the front and rear axle may only differ in the dimension L (see drawing Z83a). Additionally, the following provisions apply:

Inner diameter: 14,5mm, tolerance ± 0.5 mm

Outer diameter: max. 45mm

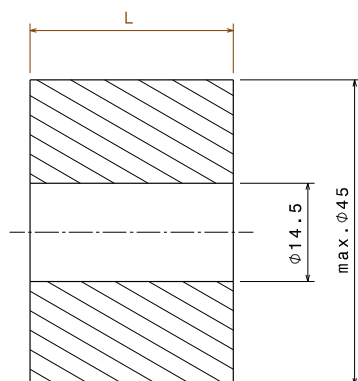
Material: POM with a density of 1,40 to 1,45 kg/dm³

Additionally, it is permitted to install one (1) standard component “bump rubber/stop” (EB20-064) around the piston rod of each damper.

It is at the discretion of each competitor to use the dampers with or without the outer sleeve.

10.5.3

With the exception of a sleeve in accordance with this article, the bump rubber/stop (EB20-064), the centring ring in accordance with article 10.5, the damper bearing EB20-065 and the springs in accordance with article 10.4 no other part may be installed on the piston rod outside the damper housing.



Z83a – Outer sleeve for damper stroke limitation

10.5.4 Packers

For the adjustment of the bump limiter it is permitted to install a maximum of 3 additional packers around the piston rod of each damper. No other function may result from the use of the packers. The provisions from article 10.5.2 and drawing z83a apply for the packers. Additionally, the following applies:

every packer may be fitted with one (1) slot which allows the installation of the packer onto the piston rod without dismantling the damper. No other function may arise from the slot.

The permitted dimension L for packers is 1mm, 2mm or 4mm (tolerance $\pm 0.5\text{mm}$).

It is at the discretion of each competitor to use the dampers with or without sleeves/packers in accordance with article 10.5.2

The bump-stop is a standard component (EB20-064) and must be fitted to the piston rod of each damper.

10.5.5 Parts outside damper housing

With the exception of a sleeve according to 10.5.2, packers according to 10.5.2a, the bump stop (EB20-064), the LB centring ring (LB20-027) according to 10.5, the bearing EB20-065 and the springs according to 10.4 no other part may be installed on the piston rod outside the damper housing when the vehicle is moving outside the pit lane on the track.

10.6 Anti-roll bar (EB20-052.100, EB20-053.100)

Components which are not part of the anti-roll bar may not be in contact with the sprung element of the anti-roll bar at any time. The anti-roll bar must not have any device which allows the driver to adjust the roll bars whilst the car is in motion.

With the exception of EB components and parts which are expressly permitted all other means or devices which are meant to affect the motion (in roll, yaw, pitch) of the vehicle around all three axes are prohibited.

The use of the connecting rods (EB20-052.100.01, EB20-053.100.01) is not mandatory.

Any measure which allows altering the setting of the dampers, the number of sleeves and/or the setting of the anti-roll bar without previously having to removing the front and/or rear bodywork is prohibited.

10.6a Droop stop bracket rear (EB20-053.100.25)

The droop stop bracket can optionally be used with or without the limiter according to SB20-002

10.7 Wheel carrier (EB20-052.01 R/L – EB20-053.01 R/L)

The wheel carriers are standard components.

10.8 Wheel hubs (EB20-052.03 R/L – EB20-053.03 R/L)

The wheel hubs are standard components.

10.9 Wishbones (EB20-052.10, EB20-052.11/12, EB20-053.10, EB20-053.11/12)

The wishbones are standard components.

Two wishbones must be used for each wheel.

10.9.1 Attachment of water, brake and electrical lines to wishbones

It is mandatory to attach the lines for brake fluid, for water of the brake cooling system and for electricity of the wheel speed sensors (only at the front suspension) to a wishbone tube.

The following provisions have to be met:

The wishbone tube connects a spherical joint at the wheel carrier with an inboard spherical joint.

No part of the lines or attachment material may be located further than 14mm from the wishbone tube between the two spherical joints. For the purpose of this provision the tube begins 150mm from the middle of the next spherical joint at both ends.

Between the two spherical joints within the area defined under 2) the corresponding line must run along the shortest path. No line may be attached to two wishbone tubes

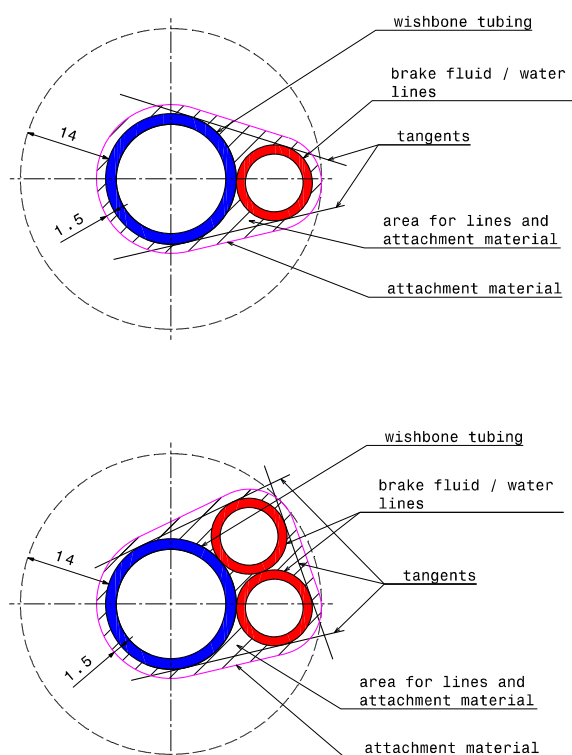
At no section perpendicular to the tube axis may the line be cut more than once.

No part of the line/lines or the attachment material may be located outside the area defined in drawing Z105.

Exceptions:

Attachment material with a maximum thickness of 1.5mm that follows the contour of the tube without any gaps may be located outside this area.

The locking heads of Ty-Raps may be located partially outside the defined area provided that every locking head fits inside a cube with an edge length of 5 mm and the distance between two locking heads is min 150 mm.



Z105 – Permitted area for the attachment of brake or water lines to wish-bone tubes

10.10 Tie rod (EB20-052.13, EB20-052.14, EB20-053.13, EB20-053.14)

The tie rods are standard components.

Tie rods and wheel carrier may only be connected through one unique linkage or pivot point.

Tie rods and steering may only be connected through one unique linkage or pivot point.

Beyond this no linkage or pivot points are permitted on the tie rods.

10.11 Push rod (EB20-052.19, EB20-052.20, EB20-053.19, EB20-053.20)

The push rods are standard components.

Pushrod and rocker may only be connected through one unique linkage or pivot point.

Pushrod and wheel carrier may only be connected through one unique linkage or pivot point.

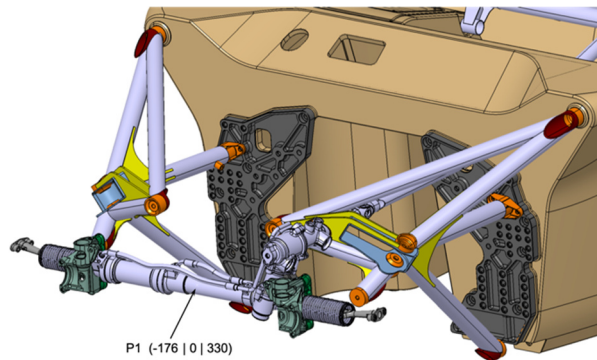
Beyond this no linkage or pivot points are permitted on the push rods.

10.12 Steering

The power steering (EB20-008) must be bolted to the engine mount SB20-013 so that the axis of the gear rack runs through point P1 (x=-176 mm, y=0, z=330 mm).

The steering must operate the front wheels only.

The mounting of the front axle anti-roll bar (EB20-052.100) to the steering (EB20-008) is mandatory.



Z69 – Steering position

10.12a Steering servo pump (EB20-048)

The EB component servo pump (EB20-048) must be fitted to the 4 points provided for that purpose inside the service box on the tank cover by using 4 so-called silent blocks. The silent blocks must have on each side M8 threads which are solely connected through at least 15 mm high, cylindrical (minimum diameter 12 mm) elastomer.

The servo pump is available from the manufacturer with different speeds. It is at the discretion of the competitor which of the available speeds he wishes to use.

10.12b Steering wheel

One steering wheel which must be connected to the steering column (EB20-057) with a quick coupling (EB20-047) is mandatory in each race car.

The design of the steering wheel is free. The use of CFRP as a material for the steering wheel is prohibited.

Exception:

Add-on parts of the steering wheel may be made out of CFRP on condition that the total weight of all CFRP parts is not more than 100 grams.

The only permitted electrical devices in and on the steering wheel are the ones for the following systems:

- Operation of the radio system
- Operation of the water bottle pump
- Control for the speed limiter
- Control for the headlamp flasher
- Actuation of the water spray system for the cooling of the brakes
- Shift levers (EB20-016)
- Actuation of the windscreen water pump/wiper
- Actuation for DDU reset
- Actuation gear 0
- Operate starter motor
- Operate speed limiter for “slow zones” and “full course yellow”
- Operation of indicator
- Operation of map switch
- DRS Activation/deactivation
- Push-to-Pass (P2P) activation/deactivation
- Anti Lag System (ALS) activation/deactivation

10.13 Drive shaft (EB20-009)

The drive shafts are standard components. Two drive shafts must be used in each car.

11. Brakes

The parts listed in the below table are EB components.

Part	Part (EB20)-Number
Brakes	EB20-025
Brake cylinder	part of EB20-020

Table 51

It is permitted to apply temperature sensitive colours on the front side of the brake discs.

It is permitted to apply temperature stickers to the brake callipers EB20-025. The vent plugs and their threads or thread inserts in the brake calliper are free, on condition that the sole purpose of these parts is to vent the corresponding brake calliper as well as the brake pipe system.

11.1 Brake circuits

All cars must have two completely separate brake circuits, one operating on the wheels of the front axle and one on the wheels of the rear axle. Each brake circuit must have a separate brake cylinder (part of EB20-020) which is operated purely mechanically by one and the same foot pedal (component EB20-020) through the application of muscular strength. With the exception of the mandatory EB20 brake cylinders (EB20-020), no other device or measure which is capable of affecting the brake fluid pressure is permitted in the complete brake system.

The pressure in the brake circuit must be used solely for the purpose of pressing the brake pads against the brake disc. The brake system must be designed so that if a failure or a leakage occurs in one circuit, the second circuit remains fully functional.

11.2 Brake force distribution

The distribution of the brake force between the front and rear axle may only be influenced through the brake force distribution mechanism (brake balancer EB20-095) and the brake balance adjuster (part of EB20-020) whilst the car is in motion. A hydraulic connection between the two brake circuits is not permitted.

With the exception of the brake force distribution mechanism (EB20-095) no device whatsoever may be present in the car which allows to influence the brake force distribution between the front and rear axle and/or between the right and left side of the vehicle.

There must be a fixed ratio that may not be changed whilst driving between the brake pedal, the brake balance adjuster and EB20-095. The use of the brake balance adjuster may not result in any function other than the distribution of the brake force between front and rear axle. Any other mechanical, hydraulic, pneumatic, electric or electronic device or measure which is capable of affecting the brake force distribution and/or the braking pressure is prohibited.

11.3 Number of callipers

Only one brake calliper (EB20-025) per wheel is permitted. The brake callipers including their attachments must be completely accommodated within the corresponding wheel disc.

11.4 Parts between piston and disc

With the exception of the brake pads no part or substance may be located between the pistons of the brake callipers and the brake discs.

Any relative motion between the brake calliper and the wheel carrier is prohibited.

11.5 Brake water cooling (EB20-094)

The use of the brake water cooling (EB20-094) is optional. Any other measure or device which is suitable to deliver other cooling agents than air to parts of the brakes is prohibited.

The activation of the pump of the system may only be realised through a button/switch situated on the steering wheel.

A relative motion between the water containing components and the monocoque is prohibited with the exception of components located inside the wheel arch.

Whilst the vehicle is in motion the water carried on board for the brake cooling may only exit through the intended openings of the EB-spray pipe in close proximity to the brake discs/brake callipers.

All parts of the brake water cooling system that can potentially contain water may have a maximum total inner volume of 7,5 dm³. Only 1,5 dm³ of the volume may be placed outside a virtual space that dimensions in X-direction is < 500mm.

11.6 Brake duct (EB20-091/092)

The brake cooling ducts are standard components.

11.7 Servo assistance

Any servo assistance to the brake system is prohibited.

11.8 Active systems

Active systems in connection with the brake system are prohibited.

Exception:

The transmission of the brake pressure to the DRS is permitted.

11.9 Anti-lock system

Any device or measure designed to prevent one or several wheels from locking when the driver applies pressure to the brake pedal is forbidden.

11.10 Pressure accumulator

Pressure accumulators in the brake system are forbidden.

12. Tyres, wheels and pneumatic jacks

The parts listed in the below table are EB or LB components.

Part designation	Component (EB)-Number
Air jacks	EB20-017
Front slicks**	EB20-060 D
Rear slicks**	EB20-061 D
Front rain tires**	EB20-062 D
Rear rain tires**	EB20-063 D
Tire pressure monitoring system	EB20-117
Rims*	EB20-072/072.01
Valve body*	LB20-012
Valve insert*	LB20-012

Table 52

* mandatory for ITR brands/ manufacturers only

** mandatory during DTM events only

The race car in running condition must have 4 complete wheels, two on the front axle and two on the rear axle.

12.1 Rims ITR

(mandatory for ITR brands/manufacturers only)

The rims are standard components (EB20-072.01/02/03).

Balance weights, valve body (LB20-012), valve insert (LB20-012) and tire pressure sensors (part of EB20-117) are not part of the EB component.

With the exception of the tyre pressure sensor (EB20-117), the valve body, the valve insert and the balance weights no other parts may be attached to the rims.

In no case may the “open cross-section” between the spokes change or be covered.

Components which are not part of the rim and/or are not explicitly permitted here are prohibited.

The liberties for the colour design of the rims are bindingly described in the specification sheet (filed on the DMSB -server).

12.2 tba

12.3 Tyres

Only the mandatory standard tyres (EB20-060 D/061 D/062 D/063 D) may be used. The complete wheels have the following max dimensions.

Front: width 336mm, diameter 685mm

Rear: width 356mm, diameter 712mm

12.4 Wheel mounting / Wheel nut (EB20-052.98/99)

The wheel nuts and the corresponding wheel retainer system are standard components (EB20-052.06).

12.5 Air jacks

The vehicle must be fitted with 4 air jacks (EB20-017) at the mandatory positions provided for that purpose.

The air system of the jacks must be completely closed and must not have any connections (apart from the attachment points) to any other part of the vehicle.

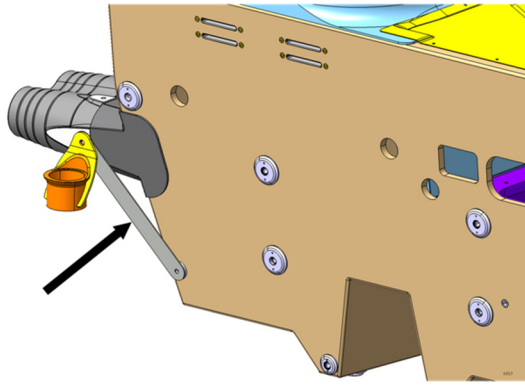
The air jacks (EB20-017) may only be used by using the below defined stroke heights:

	stroke
front suspension	155 mm
rear suspension	170 mm

Table 55

The air jacks must be installed in such a way in the car that the lower side of the extending piston are fully visible in bottom view when the pistons are retracted.

The upper attachment point of the rear air jacks on the side crash adapter and the attachment point evident in drawing Z100 on the monocoque (arrow) must be connected with a strut/a component that can transfer a minimum load of 15 kN between the two attachment points.



Z100 – mandatory strut/coupling device between the upper attachment point of the rear air jacks and the monocoque

12.6 Pressure accumulators

The four wheels fitted to the vehicle are explicitly permitted pressure accumulators. The pipes of the EB pneumatic jacks as well as their air chambers are explicitly permitted pressure accumulators.

12.7 Tyre pressure control/adjustment/monitoring systems

Any system adjusting the air pressure in the tyres is prohibited.

For the purpose of this prohibition it is not permitted to design any part of the complete wheel in such a way as to permit air leaking from the tyre whilst the car is in motion. It is at the sole discretion of the DMSB Technical Delegate to judge if any leakage is caused deliberately.

The tyre pressure must only be monitored by using EB20-117 (Tyre pressure monitoring system TPMS).

No information coming from the wheel/rim mounted parts of the TPMS may be shown/given to the driver while the car is moving.

Exception:

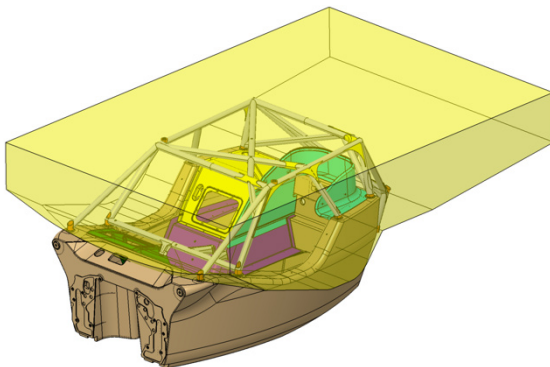
If the pressure of one or more tyres is below the required minimum level, the driver may receive an appropriate notification. This information may be displayed as long as the pressure is below the minimum level, even while the car is in motion.

12.8 Various

The number of tyres per event is limited.

13. Cockpit

The area of the vehicle defined as cockpit is shown in drawing Z107 and defined through the volume filed on the DMSB server under „SB20-015 cockpit volume“ as a 3D data set. Areas of the volume that are located outside the contour of the race car and components which form the contour are not considered to be part of the cockpit. All other components which are located inside the volume are considered to be inside the cockpit.



Z107 – the area of the vehicle defined as Cockpit

13.1 Cockpit openings

Any connection between the engine compartment and the driver's seat must be closed in a way to prevent any passage of fluid and/or flames to the driver, regardless of the vehicle's position.

Any connection between the gearbox compartment and the driver's seat must be closed so as to prevent any passage of fluid and/or flames to the driver, regardless of the vehicle's position.

13.2 Position of the driver's seat

Only one single driver's seat is permitted in the cockpit.

The seat must be installed on the left side of the car, seen in driving direction, at the position inside the monocoque provided for that purpose.

13.3 Pedal box

The pedal box is a standard component (component EB20-020).

It is permitted to attach any components to the pedal box provided that:

- the EB20-component remains unmodified
- the attached component has no influence whatsoever on the mechanical, electrical, hydraulic or pneumatic signals/impulses.

To dampen the pedal movement solely dampers in accordance with LB20-011 are permitted. The use of said dampers is not mandatory.

Individual spacers between the pedal box and the mandatory attachment points on the monocoque are permitted.

The footrests of the pedals may be individually designed, provided that a maximum of two screws per pedal is used and that the footrests do not have any whatsoever influence on the mechanical or hydraulic attributes of the Pedals and the attached cylinders.

The brake/ clutch cylinders of the EB component are available in different designs (see specification sheet). It is at the discretion of the competitor to decide which of the specified cylinders he uses on condition that the cylinder always complies with the stored data version.

As potentiometer for the throttle position any one of the two potentiometers defined in the specification sheet under "variations" may be used.

13.4 Driver ambient air temperature

When the race car is in motion, the ambient air temperature around the driver's head must not be more than 40° Celsius.

Exception:

In the case of an outside temperature of 30 or more degrees Celsius, the maximum permitted ambient air temperature around the driver's head is 10 degrees above the outside temperature.

No air from the engine and/or gearbox compartment may pass to the driver.

13.5 Accessories

Components and/or accessories which are not explicitly permitted in these regulations may only be used if they have no influence on the driving characteristics of the race car. Under no circumstances may the use of these components and/or accessories have an influence, whether directly or indirectly, on the engine power or characteristics, the steering, the drive train, the brakes, the handling and/or the aerodynamic downforce. The assessment if components or accessories comply with these regulations is at the sole discretion of the DMSB Technical Delegate.

13.6 Adjustment systems

Only the following systems or components may be adjusted and/or changed or controlled by the driver seated in the kp:

• DDU Reset
• Throttle unit by means of accelerator
• Driver cooling air (change flow direction)
• Driver's door (opening and closing)
• Fire extinguisher system (EB20-100)

• Operating switch for the instruments
• Speed limiter
• Gearbox (gear change)
• Main circuit switch
• Clutch (change in distance of the friction plates)
• Steering (steering angle of the front wheels, activation of servo pump EB20•048 with engine=out)
• Neutral switch
• Rear view mirrors
• Windscreen washer system
• Windscreen heating
• Windscreen wipers
• Side windows (opening and closing)
• Safety belts
• Indicators
• Actuation signalling lights
• Adjustment of seat
• Radio communication
• drinking water pump
• Electric motor (LB) which is located inside the cockpit
• Warning light
• Water spray system for brake cooling
• Ignition switch
• Map switch
• Pedal slider
• Engine starter button
• Lights (head, rear and rain)
• Brake balance adjuster
• Windscreen-Washer water pump
• Pitstop lights
• Gear emergency
• DRS activation
• Push-to-Pass activation

Table 68

activate functions of systems depending on the activation of aforementioned systems is considered to be a coupling of systems.

The driver may only operate the above listed systems even if he is located outside the Cockpit during the time between the end of a qualifying and the start of the subsequent race.

The control of the electric motor for the driver cooling air must be limited to the on/off function. Different fan speeds are not permitted.

13.7 Cockpit design

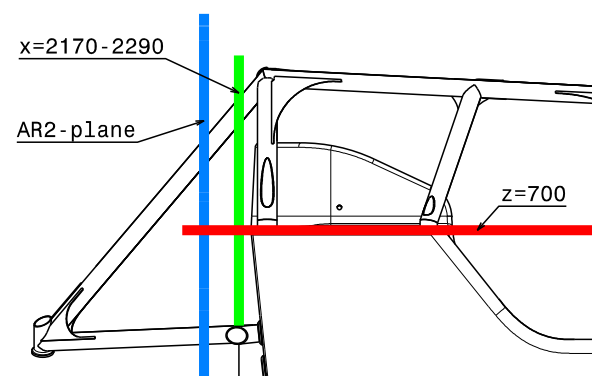
The cockpit must be designed so that the extrication of the driver by means of the Kendrick Extrication Device (K.E.D®) is not obstructed. The design of the cockpit in this area and of the corresponding components must be submitted to the DMSB Technical Delegate for approval before the race car is built.

13.8 rear bulkhead/fire wall

It is obligatory to install a rear bulkhead which is (in side view) positioned behind the driver's seat and isolates the cockpit completely. However, minimum opening connected to the opening according to 3.11.2 for the ventilation of the cockpit it is permissible on condition that the cockpit isolation function is duly maintained.

Material: The bulkhead or the part must be made of a rigid and sufficiently fireproofing material.
Carbon fibre material having honeycomb construction no less than 10mm thickness.
Carbon fibre composite having no less than 3.5mm thickness.
Metal material having no less than 1.0mm thickness.

Harnesses or pipes may pass through the rear bulkhead on condition of maintaining the function as bulkhead, and it is permitted to change the bulkhead material of the minimum area to metal material of minimum thickness 2.0mm.
It is at the discretion of the DMSB Technical Delegate to decide whether or not these conditions are respected.



Z128 – mandatory position of the rear bulkhead

14. Safety equipment/Regulations and seat

14.1 Safety belts

It is mandatory to wear two shoulder straps, one abdominal strap and two straps between the legs.

The belts must be homologated by the FIA and comply with the norm 8853-2016.

The anchorage points of the belts and the installation in the race car must be executed in compliance with the provisions of Article 253.6 of the Appendix J to the ISC. The belts must be guided through the slots provided for that purpose in the monocoque and be attached to the inserts of the monocoque also provided for that purpose.

14.2 General circuit breaker

The driver, when seated normally with the safety belts fastened and the steering wheel in place, must be able to cut off all electrical circuits of the car by means of a spark proof circuit breaker switch.

The switch must be marked by a symbol showing a red spark in a white edged blue triangle.

There must also be an exterior cut off switch with the same function. It must be situated immediately in front of the windscreen on the exterior left-hand side of the car and in close proximity to the trigger switch for the extinguisher system (EB20-100). It must be marked by a red spark in a white-edged blue triangle with an edge length of at least 12 cm.

14.3 Fire extinguisher system/fire extinguishers (EB20 -100)

The vehicle must be equipped with a fire extinguishing system (EB20-100).

The extinguishant pipes and extinguisher nozzles must be arranged so that the extinguishant discharges into the Cockpit and into the engine compartment when the system is triggered. The extinguisher nozzles must be suitable for the extinguishant and be installed in such a way that they are not directly pointed at the driver.

The following information must be visible on every extinguisher:

Capacity

Type of extinguishant

Weight or volume of the extinguishant

Date of the inspection of the extinguisher

Manufacturer, type designation, serial number and production date

This date must not date back more than two years since the last filling or the last check.

All the information listed here and if applicable the pressure indicator of the fire extinguishing system must be located so that a check is easily possible.

All fire extinguishing containers must be mounted at the positions provided for that purpose in the monocoque (EB20-001 D+J).

All supports and mounting points, together with the fire extinguisher container completely mounted in the car, must be able to withstand an acceleration of at least 25 g.

All fire extinguishing equipment must be fire-resistant.

Any triggering system having its own source of energy is permitted, provided that it is possible to operate all fire extinguishers should the main electrical circuits of the car fail.

The driver must be able to trigger the entire volume of extinguishing agent manually when seated normally in the car with his safety belts fastened and the steering wheel in place. Furthermore, an outside triggering device combined with the circuit-breaker switch must be in place. It must be marked with a letter "E" in red inside a white circle of at least 10 cm in diameter with a red edge. The triggering system must be situated close to the outside general circuit breaker on the left side of the car, at the lower part of the windscreen.

The system must work in any position of the car.

The extinguishant container of the fire extinguisher system is an explicitly permitted pressure accumulator.

14.3.1 driver exit time

From his normal seating position, the driver must be able to exit the car within 7 seconds through the driver's door and within 9 seconds through the passenger's door. At the beginning of this test the driver must be seated normally in his car. He must wear his usual driving equipment and his helmet, and all the seat belts must be fastened. The steering wheel must be correctly mounted to the car and the doors must be closed.

14.4 Towing device

Each car must be equipped with a rear and a front towing rope which is guided through the front and the rear crash element and fitted:

At the front, directly to SB20-009 (adapter plate crash element)

At the rear directly to EB20-003 (gearbox).

The rear towing rope is a standard component (EB20-012)

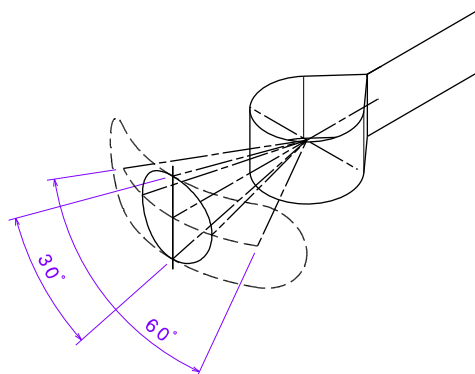
The towing rope must be fitted so that it protrudes over the front and the rear contour of the vehicle, when required, and that it is possible to create a loop with the rope outside the contour and without using tools, with this loop having an internal diameter of at least 60 mm in plan view.

The towing loops must be placed in such a way that easy access is provided should the car be stopped in a gravel bed.

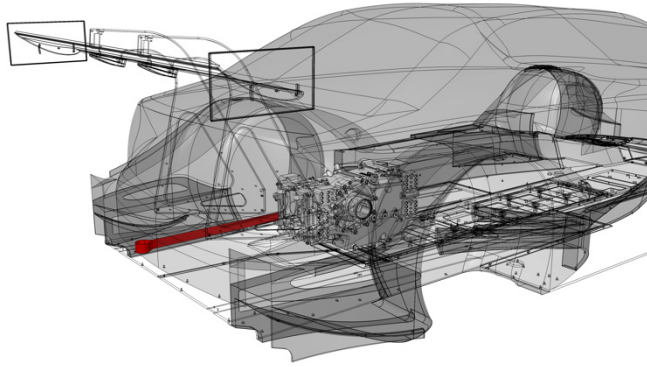
The towing ropes must be painted in clear contrast to the car's colour.

Each towing rope and the associated attachment must withstand the following forces without any structural damage:

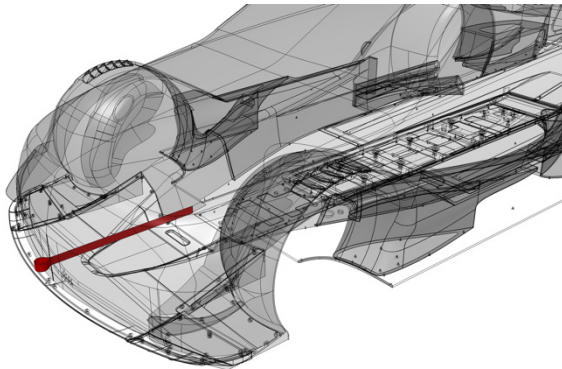
A force of at least 30 kN applied within 3 seconds which is maintained over a period of 60 seconds. The maximum possible area for the vector of the force application is defined in drawing Z71.



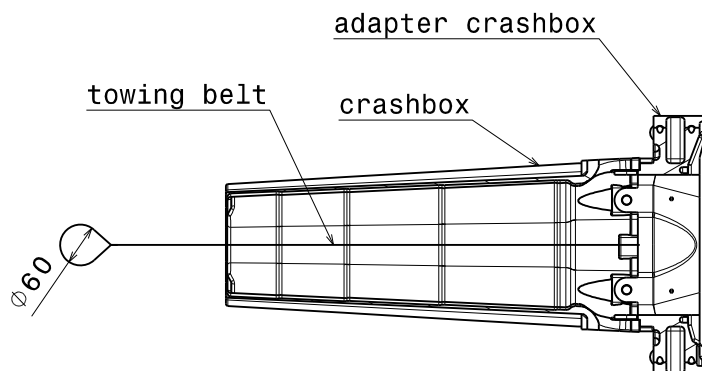
Z71 – Maximum vector for force application towing band



Z72 – Rear towing rope



Z73 – Front towing rope



Z74 – Internal diameter of towing eyes

14.5 Lifting devices

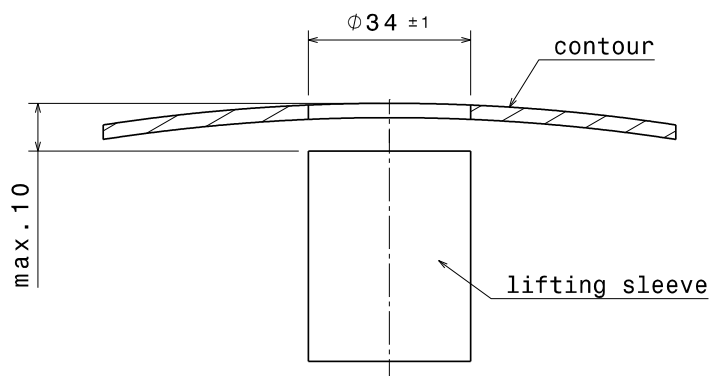
A lifting sleeve must be fixed at each of the fixation points on the rollover structure provided for that purpose.

The lifting sleeves must be fitted so that the vehicle with a full fuel tank can be lifted with a recovery device and be transported. The centreline of the lifting sleeves must always run vertically to plane z0 of the race car.

The distance of the intersection point of the centreline with the exterior contour of the vehicle and the exterior contour of the lifting sleeve must not be more than 10 mm. There must be an opening with a diameter of 34 mm (tolerance ± 1 mm) in the exterior contour above each lifting sleeve.

Under normal driving, it is permitted to bridge the gaps of the openings with adhesive foil.

The application of the openings and of the lifting sleeves is part of the vehicle homologation and specified in the homologation form. The design must be submitted to the DMSB Technical Delegate for approval before the final homologation.



Z75 – Position lifting sleeve/contour

14.6 Head and Neck support

The use of an FIA homologated head and neck support for the drivers is mandatory.

14.7 Driver seat, driver seat inlay and head protection

The parts listed in the below table are standard components.

Part specification	Component number
Head protection	EB20-021
Seat inlay	EB20-027 D+J

Table 56

14.8.1 Driver seat

Foam with a thickness of 20mm (in unloaded condition) must be applied between the lowest point of the driver's pelvic region (when seated normally with the safety belts fastened) and the corresponding contact surface on the monocoque floor.

The driver's seat must be designed in a way that the highest point of the driver's helmet is situated below $z=1,000$ mm when the driver in his racing equipment is seated normally with the safety belts fastened.

No part of the driver's helmet must be located in front of $x=1.745$ mm when the car is in motion.

Only homogenous foam material is permitted for the driver's seat. The foam used must have a minimum density of 25 g/litre according to the specification sheet of the foam manufacturer.

The side of the seat facing the driver must be covered with a flame-resistant material (e.g. Nomex fabric). The cover material used must not contain any resin.

14.8.2 Driver seat inlay

Standard component EB20-027 D, EB20-027 J

Extractable seat EB20-027.01 D+J

14.8.3 Head protection

Standard component EB20-021

The attachments of the head protection must be marked so that they can be easily and immediately identified/ located by the rescue staff.

It must be possible to remove the head protection without tools.

It is permitted to cover the head protection with flame-resistant material. For this purpose, the material chosen must be bonded with the head protection over its entire surface.

14.9 Pressure accumulator

A pressure accumulator is permitted inside the seat inlay to optimise the seating comfort. The pressure accumulator must not have any connections to other components of the car. Only air taken from the Cockpit may be stored inside the accumulator.

A pressure reduction may only take place diffusely. Pressure variations must be initiated by the driver's muscular effort only. The maximum permitted volume of the pressure accumulator is 1 litre; the maximum permitted excess pressure is 300 mbar.

15. Monocoque Rollover structure and subframe

The parts listed in the below table are standard components relevant for this article.

Part specification	Component number
Monocoque	EB20-001D+J
Rollover structure	EB20-001.01
Front subframe	EB20-002

Table 57

The parts listed in the below table are specification components relevant for this article.

Part specification	Component number
Engine shear panel	SB20-006
Engine flange plate	SB20-010
Engine bracket	SB20-008

Table 58

The serial number of the monocoque is the vehicle identification number.

The vehicle identification number and the codes of the transponder laminated into the monocoque form a unit which must not be modified without the approval of the DMSB Technical Delegate.

15.1 Monocoque

The monocoque (EB20-001 D+J) must be mounted in the vehicle so that all the monocoque reference points are located at their mandatory position in the coordinate system of the vehicle (see Article 3.2).

Screw attachment points are provided on the safety cell (monocoque + rollover structure) for certain components and their supports respectively (see table 74) which must be used in unmodified form for the attachment of the corresponding components. It is permitted to also attach different components to these points.

Component	Points provided for the attachment The exact position is of the mandatory points is defined in the file "EB20-001 D+J/final machining" on the DMSB server under "mandatory regulation data files"
Battery support	118, 119, 120, 134
Bellhouse (EB20-004)	110, 111, 112, 113, 114, 115
Flange plate (SB20-010)	96-101, 103-106, 108, 109
Engine monocoque bracket (SB20-008)	102, 107
Engine plate (SB20-006);	1, 6
Front subframe (EB20-002)	94, 95
Skid pad frame (EB20-035 D+J)	1 – 10

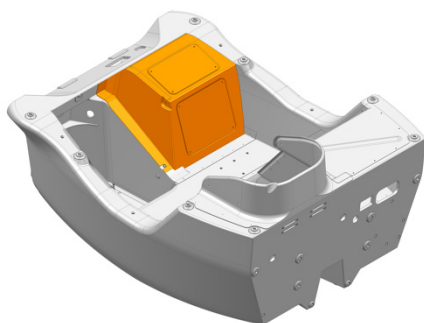
Floor (EB20-082 D+J)	11 – 14, 17 – 20
Bracket for steering servo pump	4 top heads inside the service box on the fuel tank cover
Fire extinguisher system	90 – 93
Air jacks (EB20-017);	116, 117
Pedal box (EB20-020);	23 – 38
Safety belts	39 – 63, 121 – 132
Rollover structure (EB20-001.01);	64 – 73

Table 74

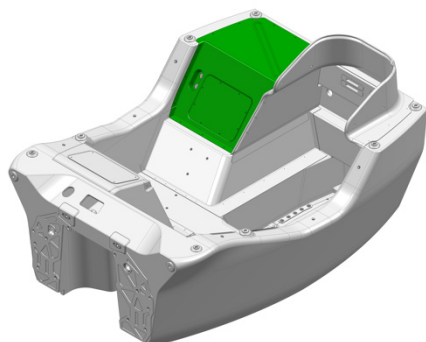
Unused apertures in the monocoque must be closed. Design and material of the closings are free.

15.1.2 Cover service box

It is permitted to apply individual openings to the Cockpit side cover of the service box (see drawing Z7, brown indicated surfaces) and to the tank box (see drawing Z7a, green indicated surfaces), respectively, on condition that the total of all individual openings is not more than 600 cm².



Z7 – Service box (orange), part of EB20-001 D+J



Z7a – Tank box (green), part of EB20-001 D+J

15.2 Prohibited measures to the monocoque

Any thermal treatment of the monocoque is prohibited.

Any repair on the monocoque without the approval of the DMSB Technical Delegate is prohibited.

Any measure resulting in an increase of the torsion stiffness of the monocoque is prohibited.

15.3 Rollover structure

Only add-on parts for which an attachment point is provided and submitted may be fixed to the rollover structure. The attachment points must always be used in compliance with their specific purpose and with the submitted definition.

Attachment points on the rollover structure are provided for the following components and they must be used without any modification.

- Bodywork parts
- Lifting device
- Inboard cameras
- Steering column support
- Interior mirror support
- Rear view monitor support
- DDU display support
- Centre console support

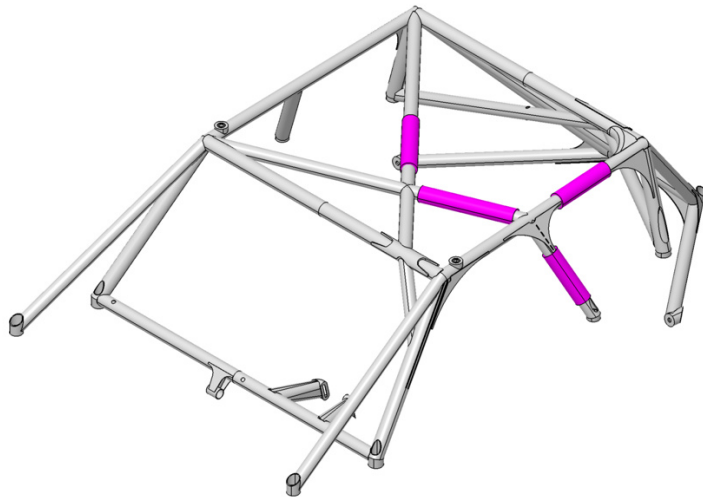
Furthermore, adhesive bonds on the rollover structure are permitted, but the only permitted adhesive is „Würth Klebt und Dichtet“.

Exception:

Any kind of adhesive may be used for the supports of cable ties/ tie wraps in accordance with 15.1.2.

The monocoque and the rollover structure are allocated to a driver by means of the vehicle identification number at the latest 8 days before the first event of a season. Any subsequent change is subject to the written approval of the technical delegate. All bars of the rollover structure must have a minimum distance (clearance width) of 75 mm to the driver's helmet when the driver is seated normally in his car, ready to race and with the safety belts fastened.

The bars in the driver's vicinity must be provided with a protective padding following the orange marked areas out of drawing Z104. The material used must comply with the FIA specification (see FIA Technical List 23 http://www.fia.com/sites/default/files/regulation/file/L23_roll_cage_padding.pdf).



Z104 – Positions und min length of padding at the roll cage

15.4 Engine subframe (EB20-002)

Standard component EB20-002

15.5 Engine flange plates (SB20-010)

Specification component SB20-010

15.6 Engine bracket (SB20-008)

Metal connection to the lower monocoque points

The following conditions must be respected for the engine bracket (SB20-008):

- Minimum weight = 2.0kg (in compliance with Art. 15.7)
- One-piece or two-piece design permitted
- Must be made out of steel and/or aluminium
- It must be rigidly connected to the shear panel (SB20-006)
- It is not part of the engine/engine weight
- The maximum of 4 rigid connection points to the engine is permitted.
- With the exception of the 2 points on the monocoque (see table 33b), the 4 points according to recital f), the attachment to the engine sub frame (EB20- 002) as well as the attachment to the flange plate (SB20-010) and the attachment to the shear plate (SB20-006) it must have no additional fixations and be completely located in an area which is limited by the following maximum dimensions (table 33a):

15.7 Engine mount (SB20-013)

The engine mount is a specification component SB20-013.

The engine mount must be made entirely out of steel and/or aluminium and may be designed as a multi-piece component. It must comply with the requirements for the prescribed crash and side pressure test. A corresponding analytical proof is accepted by the DMSB. The DMSB, however, reserves the right to carry out physical tests on the engine mount.

The minimum weight for the engine mount is 3 kilograms. Engine mount (SB20-013), engine bracket (SB20-008) and crash adapter (SB20-009) must have a minimum weight of 9,5 kilograms in total.

The engine mount must be completely situated in an area which is defined by:

x	x	y	y	z	z
-160	-45	-370	+370	80	520

Table 59

The engine mount must be bolted to the engine subframe (EB20-002/EB20-002 D) at the points provided for that purpose.

The front mounting points of the upper wishbones (front axle/01) must be located at the engine mount.

Only the following positions are permitted for the mounting points of the wishbones (front axle):

Point	x	y	z	
P1	-146	±190	100	Bolting points Front axle-U1
P2	-98	±190	100	
P3	-146	±190	80	
P4	-98	±190	80	
P5	-146	±190	60	
P6	-98	±190	60	
P7	-134	±368	350	Bolting points Front axle-O1
P8	-86	±368	350	
P9	-134	±368	330	
P10	-86	±368	330	
P11	-134	±368	310	
P12	-86	±368	310	

Table 60

At least two mounting points of the lower wishbones (front axle/U1) must be located at the crash adapter (SB20-009) and be used as mounting points.

The steering connection defined in Article 10.12 must also be respected.

15.8 Engine plate (SB20-006)

The minimum weight for the engine plate is 4 Kg.

The attachment of the steering as defined in Article 10.12 must also be respected.

These material specifications are applicable for the complete component, unless otherwise indicated. If several materials are permitted, the corresponding component must nevertheless be made out of one single material only. If not otherwise indicated, beryllium, ceramic materials, titan, sintered materials, beryllium and boron alloyed aluminium (BORALYN) are prohibited, even if the material specification states “free”.

	Material specification	Minimum weight
Engine mount	Steel and/or aluminium	3 Kilograms

16. Safety and crash structures

The parts listed in the below table are standard or specification components relevant for this article.

Part specification	Component number
Front crash element	EB20-006
Rear crash element	EB20-006
Side crash element	EB20-007
Front adapter crash element	SB20-009

Table 61

16.1 Front crash element

Standard component EB20-006

The crash element must be fixed to the adapter (SB20-009) by means of 8 M12 screws.

16.2 Rear crash element

Standard component EB20-006

16.3 Side crash element

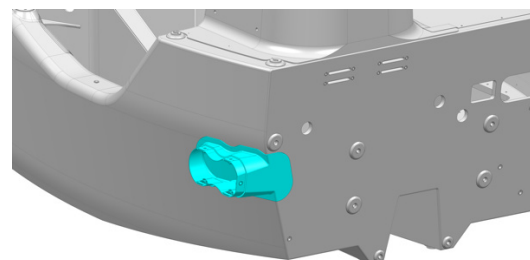
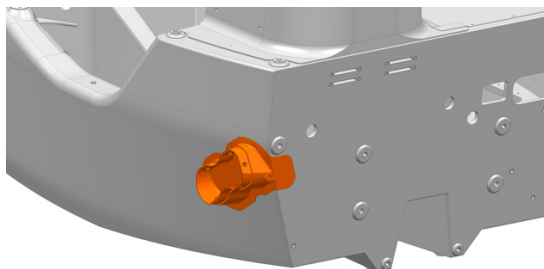
Standard component EB20-007

The car must be provided with 4 side crash elements.

The rear side crash element may be mounted in two different position by either using side crash adapter EB20-038.1 or EB20-038.2.

When using EB20-038.1 the upper air jack mounting point must be located at Z= 372mm

When using EB20-038.2 the upper air jack mounting point must be located at Z= 354.6 mm



Z129 -Optional positions adapter rear side crasher

16.4 Front adapter crash element (SB20-009)

The adapter for the attachment of the front crash element (EB20-006) is a specification component (SB20-009).

The adapter must be made entirely out of steel and/or aluminium and may be designed as a multi-piece component. It must comply with the requirements for the prescribed DMSB crash and side pressure test. A corresponding analytical proof is accepted by the DMSB. The DMSB, however, reserve the right to carry out real tests on the adapter.

The minimum weight for the adapter is 3.5 kilograms. Crash adapter (SB20-009), engine bracket (SB20-008) and engine mount (SB20-009) must have a minimum weight of 9.5 kilograms in total.

The adapter must be completely situated in an area which is defined by:

x	x	y	y	z	z
-220	-45	-230	+230	-2	330

Table 62

The adapter must be bolted to the engine mount (SB20-013) at the minimum of two points.

16.5 Attachment points at the crash elements

It is permitted to use the 4 floating anchor nuts incorporated at the front face of components EB20-006 and EB20-007 for the attachment of components.

It is permitted to use the attachment screws crash elements/ crash element adapters also for the attachment of other components.

17. Fuel

Only commercially available, unleaded fuel with the minimum specification „SUPER PLUS“ in accordance with standard DIN EN 228 and which complies with the limit values according to Article 252.9.1 in the Appendix J to the ISC may be used.

Only ambient air may be mixed with the fuel as oxidant. Any artificial modification of the ambient air composition is prohibited.

18. TV CAMERAS AND MARSHALLING SYSTEM

18.1 TV Inboard and onboard cameras

Throughout a DTM Event, all participants must fit and use the cameras assigned by the ITR as well as the electronic devices necessary for their operation, in the cars assigned by the ITR and in the specified position.

The decision which of the below cameras and positions will be installed and operated in what car at which DTM Event is at the sole discretion of the ITR.

Camera	Coverage area of the camera	Mandatory installation point/ method
K1	Parts of the dashboard, inboard advertising panel, parts of the bonnet, track in front of the car	Inside the car in the vicinity of the interior mirror. Individual support which makes it possible to incline the camera body fitted in parallel (with reference to the centre axis of the lens) to plane Z0 and Y by +10/-15 degrees (upwards/ downwards) and to vary the distance to the A-pillar tube between 20 and 40 mm.
K2	Angle of vision in parallel to plane Y0 to the rear. Parts of the Cockpit, parts of the boot lid, parts of the rear wing, the track and area immediately behind the car	Inside the car as close as possible to Y=0 and the rear window. Individual support.
K3	Angle of vision in parallel to plane Y0 to the rear. Track and area immediately behind the car.	Outside of the car or within the contour between z=380 and Z=420 mm. The camera may be located within the homologated contour on condition that the homologated contour is not changed.

		In this case, the contour immediately in front of the lens of the camera must be transparent. Individual support.
K4	360 degrees rotation, passenger view	Inside the car In the area of the fuel cell, at eye level of the driver. Support is provided.
K5	Driver, steering wheel, parts of the Cockpit	Inside the car (left- or right-hand side) At defined attachment point on the rollover structure Standard support
K6 (EB20-115)	Viewing direction: forward Field of vision: outer area of the front tire, area beside and in front of car	Outside of the car, right hand side The camera must be fitted so that at least the foremost part of the lens fits entirely inside the area K6 define below: X=400 up to 900 mm Y=875 up to 1050 mm Z=200 up to 450 mm The camera must be fitted so that the central axis of the lens is in parallel to plane FL and that the foremost area of the lens is not covered by any parts of the contour in frontal view. It is mandatory to cover the camera with the EB component (EB20-115). If no car is allocated a K6 it is not mandatory to fit the camera cover (EB20-115). In this case it is also permitted to remove the homologated bridging surface.
K8	Viewing direction: forward Field of vision: exhaust exit, lateral aerodynamic add-on components, parts of the track beside and in front of the car	Outside of the car, right hand side The camera must be fitted so that at least the foremost part of the lens fits entirely inside the area K8 define below: X=2.100 up to 2.350 mm Y=775 up to 975 mm Z=450 up to 750 mm The camera must be fitted so that the central axis of the lens is in parallel to plane FL and that the foremost area of the lens is not covered by any parts of the contour in frontal view starting at x=1300mm. It is mandatory to cover the camera with the EB component (EB20-XXX). Cars which are not allocated with a K8 must fit the camera cover (EB20-XXX) according to the aforementioned provisions without a camera. The opening resulting from the absent camera may be closed. If no car is allocated a K8 it is not mandatory to fit the camera cover (SB20-016). In this case it is also permitted to remove the homologated bridging surface.
K9	Track immediately in front of the car, possibly parts of the front splitter	Outside of the car or within the maximum contour. The camera may be located within the race car, on condition that the contour is not changed. In this case, the contour immediately in front of the view field of the camera must be transparent. Individual support.
K10	Viewing direction: face of the driver	Inside, behind the steering wheel (viewed from driver) in the vicinity of the DDU
K11	Viewing direction: towards the front so that the steering wheel (as fully as possible) and the area in front of the car (view through the windscreen) is visible	On the outside of the headrest
Incident camera	See article 18.5	

Table 70

The electronic system necessary for the operation of the cameras must be fitted in the standard component EB20-001 D+J, in the so-called „camera pan”. The electrical connection of the single components and cameras must be executed in compliance with the conditions defined by the ITR or the assigned service provider.

Any car which is fitted with a K1 must fit an LED in the area of the dashboard and in the view field of K1 and operate this LED during the corresponding event. The LED will be supplied by the ITR and has an independent voltage supply.

All cars, which are not required to carry a camera on board during a DTM Event, must fit a compensation weight in the „camera pan“ throughout the entire duration of the event. The maximum of two individual openings (maximum diameter 12 mm) are permitted in the outside wall of the camera pan to mount this compensation weight. It is not required that the removable separation inside the camera pan is mounted. The camera pan and the compensation weight together must have a minimum weight of 5 kg.

All the components and supports of the official cameras must be designed to withstand an acceleration of 25 g.

18.2 Antennas

Each car must (exception: antenna A5) be fitted with the following antennas in working order and at the positions specified:

Antenna	Function	Mandatory installation position
A1	MS GPS receiving antenna of the marshalling system EB20-034	Embedded into the roof inside the area define below: X1.400 to x1.500 Y-50 to Y+50 The contour of the car must not change due to the installation of the antenna. Above the antenna (in reference to a cone with an angle of 170 degree standing on its tip – see drawing Z83), no parts are allowed made out of carbon fibre or metal. Also, no metal containing decorative film is allowed in this area.
A2	TV signal emitting antenna	On the outside, Y=0, behind X=2.130, in parallel to plane z0, distance to A3=min. 150 mm
A3	MS system emitting and receiving antenna	On the outside, Y=0, at least 18 cm in front of rear roof edge, distance to A4=min. 100 mm
A4	TV receiving antenna for the correction/ adjustment/ movement of the inboard camera	On the inside, bonded to the windscreen on the right-hand side.
A5	Team radio emitting and receiving antenna	No mandatory position.

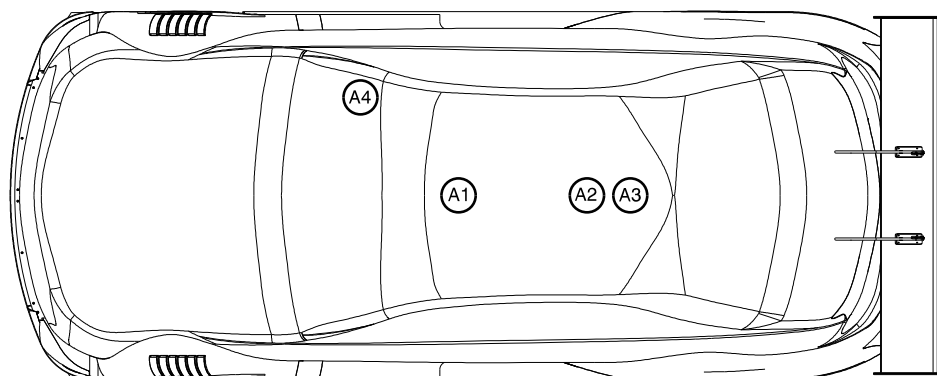
Table 71

A1 and A3 form part of the standard component EB20-034 and must be connected and mounted in compliance with the data stored on the DMSB server (Mandatory Regulation Data Files).

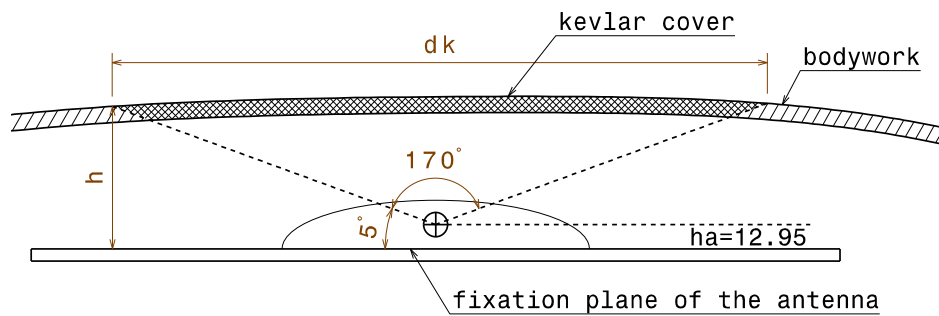
Cars which are not required to carry a camera assigned by the ITR during a DTM Event may use a dummy identical in construction (outside design, installation position and weight) instead of A2.

The antennas or antenna dummies fitted to the car are not taken into consideration for the determination of the bodywork height.

Should the A5 signals interfere with one of the mandatory antennas A1 to A4, the competitor must move A5 to another position.



Z82 – Position of the mandatory antennas



Z84 – Metal and CFRP free area above antenna A1

18.3 Telemetry/Radio communication

Any transmission of data and/or signals of whatever kind to a station/device outside the car or vice-versa while the race car is in motion* is prohibited, with the exception of:

- Eligible information displayed to the cars on boards from the pit wall
- Signals coming from the official lap trigger transmitter with the only purpose of establishing pit or sector times (lap trigger signals) and that may only be received by using EB20-058.
- Body movements, signals from the driver
- Voice radio communication (team radio) as far as sporting regulations are respected
- Radio signals of the official TV cameras including the unidirectional transmission of signals referring to vehicle speed, gear and throttle position
- Data communication of the marshalling system EB20-034

*For the purpose of this article “in motion” also means the time the race car spends in the pit lane during a race.

With the exception of the aforementioned points, any data/signal transmission via infrared, laser, digital/analogue wireless interfaces and similar systems from and to the car during an event are prohibited. During an event, no such device must be inside the race car.

The measurement of tyre and brake temperatures by means of infrared measuring devices on the stationary car is permitted.

See also article 8.17

18.4 Lap trigger receiver (EB20-058)

With the lap trigger receiver, it is permitted to receive and exploit maximum once per lap the signal of the lap trigger signal transmitter installed by the official timekeeping. It is not permitted to exploit signals of other transmitters.

As a reference for the transmitted signals the following parameters must be stored in the control unit (EB20-022) and used without modification:

axle	wheel circumference mm
front	2100 mm

Table 69

18.5 Incident camera

Each participant must mount an operational incident camera (EB20-029) in working order (image and data recording and logging) inside the car so that the pictures recorded by the camera simultaneously show the steering wheel (completely, if possible) and the area in front of the vehicle (view through the windscreen). The DMSB Technical Delegates may request a change of the camera position and of the point of view.

There must be no component between the camera and the steering wheel or between the camera and the windscreen which might obstruct the field of view of the camera.

The required memory card (Micro SD) will be supplied by the DMSB and installed by official scrutineers during scrutineering of each Event.

The memory card slot will be sealed by the official scrutineers before the first free practice. It is the participant's responsibility to ensure that the seal remains intact and that it is not removed until the end of the parc fermé after the second race of an event. Only the official scrutineers are authorized to remove the memory card in the period until the end of the parc fermé after the race.

The camera must be connected so that:

The voltage supply is ensured in the position „ignition on“

The voltage supply is only cut off in the position “ignition off”.

Camera must be switched 'on' whenever the car is moving by engine power.

18.6 Marshalling system EB20-034

The marshalling system EB20-034 is a standard component which must be installed, connected and operated in accordance with the manual stored on the DMSB server. The marshalling system control unit must be mounted on top of the tank box (see drawing 7a).

The marshalling system must be turned on and be operational when the car is in motion in the pit lane or the race track.

19. Provisions applying for all articles

The use of the quick refuel valve block is prohibited during DTM events.

19.1 Prohibited materials

The conditions below apply for all parts of the vehicle which are neither listed as EB component nor as SB or LB component.

The use of the following materials is only permitted if explicitly stated in an article of these regulations, including the definition of their specific application:

- Ceramic materials
- Titanium
- Sintered materials
- Beryllium
- Boron alloyed aluminium (BORALYN)

19.2 Material consistence/specifications

To be eligible, at least 88% of the metal alloy must consist of metal components.

All steel must have a volume weight of more than 7,5 gr/cm³.

Aluminium alloy must always have a volume weight of more than 2,5 gr/cm³.

The use of magnesium sheet metal is forbidden.

19.3 Use of composite materials

The use of positive couplings according to DIN 918 in connection with ISO 1891 on or in the components for which the use of composite material is permitted in these regulations is prohibited unless expressly permitted for a certain component.

The use of CFRP is prohibited for the below components:

- Steering wheel (exception see article 10.12b)
- Pipelines
- Attachments of suspension components
- Screws and bolts
- Rotating shafts – exception: propshaft (LB20-033)
- Lubricant containing components

19.4 Coupling of systems

Any coupling of systems and of their functions is prohibited, unless any such coupling is explicitly permitted in these regulations.

Any device or measure which is capable of converting and/or storing energy from the movement of the vehicle and making it available again to propel the vehicle is prohibited.

Electrical energy must only be stored in batteries and capacitors. Electrical energy for the operation of the electrical systems of the car must always be generated by means of the EB alternator (EB20-014).

Any energy storage inside the vehicle is prohibited with the exception of electrical batteries and capacitors as well as permitted pressure accumulators.

19.5 Mechanical outputs

Mechanical outputs from the engine and/or the transmission are only permitted to operate:

- the water pump
- the oil pump
- the alternator (EB20-014)
- the high pressure fuel pump (EB20-119 D or EB20-119 J)
- the propshaft (LB20-033)
- the air condition (LB20-tbd) – only during races with total distance > 200 km

19.6 Hydraulic lines

All hydraulic fluid lines that are not subjected to sudden pressure peaks, with the exception of lines impinged solely by gravity, must have a minimum burst pressure of 408 bar at the maximum operating temperature of 232°C when used with steel connectors. If they are used with aluminium connectors, they must have a minimum burst pressure of 408 bar at the maximum operating temperature or 135°C

All hydraulic fluid lines that are subjected to sudden pressure peaks must have a minimum burst pressure of 816 bar at the maximum operating temperature of 232°C.

All hydraulic fluid lines must be made out of metal or, when flexible, these lines must have an outer abrasion and flame resisting (flame-retarding) braid and they must have threaded connections.

19.7 Pressure accumulators

Pressure accumulators are prohibited.

Exceptions:

They are part of a standard component.
They are explicitly permitted

In all cases, the accumulated medium must only be used for the purpose specified in the corresponding article.

19.8 Active systems

Active systems are prohibited.

Exceptions:

Fuel mixture control
Ignition system
E-gas controller
Paddle shift (EB20-016)

19.9 Dry break couplings

The number of dry break couplings in lines containing fluid is limited to 10 in total for the complete vehicle.
Dry break couplings in the brake fluid circuit are prohibited.

If the use of air condition system is allowed by sporting regulations 5 additional dry-brake couplings may be used, provided that they are fitted to the air condition system only.

19.10 Prohibited system

Prohibited (in the sense of installation and use) are:

any measures or components not explicitly permitted with the purpose of reducing, damping and/or changing the frequency of oscillations of the vehicle or at the vehicle

any kind of dynamic vibration absorber and/or tuned mass dampers

all measures which use movable parts (parts with a relative motion with respect to the monocoque) to accelerate air

all measures which result in a limitation of the free movement (wheel travel) of EB suspension components or offer a resistance to the free movement

19.11 Panel fasteners

Panel fasteners which are located inside permitted contour modifications (art. 3.9 – A8) may protrude by a maximum of 2mm beyond the original unmodified contour in this area.

20. Modifications for the following year

The following modifications and amendments are planned for the upcoming homologation period (basic and/or additional homologation).

21. BINDING TEXT

The binding text of these regulations shall be the English version.

Headings in this document are for ease of reference only and do not form part of these regulations.

The measurements documented in drawings (whether in the regulations or filed in the „Mandatory Regulations Files“ folder on the DMSB server) are binding. If any contradictions arise between the information in the drawings and in the written text of the regulations only the written text is binding.

22. EB20, SB20 and LB20 COMPONENTS

22.1 Standard components

The following standard components (EB20-components) must totally comply with the data versions and drawings stored in the below listed subfolder and be installed in each car and be used in compliance with their specified function.

EB20-Number	Component specification	The correspondingly mandatory data versions are stored on the DMSB server (web-address) in the file "MANDATORY REGULATION DATA FILES" and there in the below defined subfolder.
EB20-001 D+J	Monocoque with bonded adapters for the mounting of the side crash elements EB20-007	Subfolder: EB20-001 monocoque
EB20-002	Engine sub frame	Subfolder: EB20-002 front sub frame
EB20-003	Gearbox	Subfolder: EB20-003 gearbox
EB20-003.1	Torque Sensing System	Subfolder: EB20-003 gearbox
EB20-004	Bellhouse	Subfolder: EB20-004 bellhouse
EB20-005	Clutch	Subfolder: EB20-005 clutch
EB20-006	Front/rear crash box	Subfolder: EB20-006 crasher
EB20-007	Side crash box	Subfolder: EB20-007 crash box side
EB20-008	Steering	Subfolder: EB20-008 power steering
EB20-009	Drive shaft	Subfolder: EB20-009 driveshaft

EB20-012	Rear towing rope	Subfolder: EB20-012 rear towing rope
EB20-013	Windscreen wiper engine	Subfolder: EB20-013 wiper engine
EB20-014	Alternator	Subfolder: EB20-014 alternator
EB20-015	Starter	Subfolder: EB20-015 starter
EB20-016	Paddle shift	Subfolder: EB20-016 paddle shift
EB20-017	Air jacks	Subfolder: EB20-017 air jacks
EB20-018 D+J	Fuel cell	Subfolder: EB20-018 fuel cell
EB20-019	tbd	Subfolder:
EB20-020	Pedal box	Subfolder: EB20-020 pedal box
EB20-021	Headrest	Subfolder: EB20-021 headrest
EB20-022	Engine control unit ECU	Subfolder: EB20-022 ECU
EB20-023 D+J	Rear wing	Subfolder: EB20-023 rear wing
EB20-024	Wheel bearing	Subfolder: EB20-024 wheel bearing
EB20-025	brakes	Subfolder: EB20-025 brakes
EB20-027 D EB20-027 J	Seat inlay	Subfolder: EB20-027 seat inlay
EB20-028 D+J	Wing supports DRS	Subfolder: EB20-028 wing support
EB20-029	Incident camera	Subfolder: EB20-029 incident camera
EB20-030	Front damper	Subfolder: EB20-030 damper front
EB20-031	Rear damper	Subfolder: EB20-031 damper rear
EB20-032	Wiring loom	Subfolder: EB20-032 loom
EB20-033	ADR	Subfolder: EB20-033 ADR
EB20-034	Marshalling system	Subfolder: EB20-034 marshalling system
EB20-035 D+J	Skid pad frame	Subfolder: EB20-035 skid pad frame
EB20-036 D	Adapter fuel cell/ flange plate	Subfolder: EB20-036 adapter fuel cell
EB20-037	Side front adapter crash box	Subfolder: EB20-037 front -adapter crash box side
EB20-038	Side rear adapter crash box	Subfolder: EB20-038 rear adapter crash box side
EB20-043	Refuelling valve	Subfolder: EB20-043 refuelling valve
EB20-044	Dashboard display DDU	Subfolder: EB20-044 DDU
EB20-045	Ballast weight	Subfolder: EB20-045 ballast weight
EB20-046	tbd	Subfolder:
EB20-047	Steering quick look device	Subfolder: EB20-047 steering quick look device
EB20-048	Steering servo pump	Subfolder: EB20-048 servo pump
EB20-050	YAW Sensor	Subfolder: EB20-050 yaw sensor
EB20-051	Power control module	Subfolder: EB20-051 power control module
EB20-052	suspension front	Subfolder: EB20-052 suspension front
EB20-053	suspension rear	Subfolder: EB20-053 suspension rear
EB20-054	brake disc belt front	Subfolder: EB20-054 brake disc belt front
EB20-055	brake disc belt rear	Subfolder: EB20-055 brake disc belt rear
EB20-056	tbd	Subfolder:
EB20-057	Steering column	Subfolder: EB20-057 steering column
EB20-058	Lap trigger receiver	Subfolder: EB20-058 lap trigger receiver
EB20-060D	Front slick tyres*	Subfolder: EB20-060 slick front
EB20-061D	Rear slick tyres*	Subfolder: EB20-061 slick rear
EB20-062D	Front rain tyres*	Subfolder: EB20-062 rain tyre front
EB20-063D	Rear rain tyres*	Subfolder: EB20-063 rain tyre rear
EB20-064	Bump Stop	Subfolder: EB20-064 Bump Stop
EB20-066	Injector Nozzle	Subfolder: EB20-066 Injector Nozzle
EB20-069D	Fuel Flow Restrictor	Subfolder: EB20-069 Fuel Flow Restrictor
EB20-070	Turbocharger	Subfolder: EB20-070 turbocharger

EB20-072	Rims*	Subfolder EB20-072 rims
EB20-074	Catalytic Converter	Subfolder: EB20-074 catalytic converter
EB20-075 D+J	Front Diffusor	Subfolder: EB20-075 front diffusor
EB20-077	Exterior mirror	Subfolder: EB20-077 exterior mirror
EB20-078	Rear diffusor	Subfolder: EB20-078 rear diffusor
EB20-079	Support Device Front Diffusor	Subfolder: EB20-079 support device FD
EB20-081	USB Memory Stick	Subfolder: EB20-081USB flash drive
EB20-082 D+J	Floor	Subfolder: EB20-082 Floor
EB20-090	Positions Display	Subfolder: EB20-090 P-Display
EB20-091	Front brake duct	Subfolder: EB20-091 Front brake duct
EB20-092	Rear brake duct	Subfolder: EB20-092 Rear brake duct
EB20-093	Rain light	Subfolder: EB20-093 rain light
EB20-094	Brake wc	Subfolder: EB20-094 brake wc
EB20-095	Brake balancer	Subfolder: EB20-095 brake balancer
EB20-099	Air gun*	Subfolder: EB20-099 Air gun
EB20-100	Fire extinguisher	Subfolder: EB20-100 fire extinguisher
EB20-105	Front-Flick	Subfolder: EB20-105 Front-Flick
EB20-106 D+J	Elephant foot	Subfolder: EB20-106 Elephant foot
EB20-107 D+J	Protection strip	Subfolder: EB20-107 Protection strip
EB20-108 D+J	Bargeboard Box	Subfolder: EB20-108 Bargeboard Box
EB20-109 D+J	Shoebox	Subfolder: EB20-109 Shoebox
EB20-111 D+J	lower wheelhouse rear	Subfolder: EB20-111 lower wheelhouse rear
EB20-112 D+J	air duct rear	Subfolder: EB20-112 air duct rear
EB20-113 D+J	mesh guard	Subfolder: EB20-113 mesh guard
EB20-115	K6 cam bracket	Subfolder: EB20-115 K6 cam bracket
EB20-116	Switch Panel	Subfolder: EB20-116 Switch Panel
EB20-117	Tyre pressure monitoring system	Subfolder: EB20-117 Tyre pressure monitoring system
EB20-119	High pressure Fuel Pump	Subfolder: EB20-119 HDP

Table 63

*for ITR brands/manufacturers only

The design details, CAD data and detailed drawings, including the specified dimensions, shapes, materials, manufacturing processes and installation positions, of the standard components submitted to the DMSB form an integral part of these regulations and are available from the DMSB upon request.

22.2 Specification parts

The following specification components (SB20-components) must be designed in compliance with the drawings and CAD data submitted to the DMSB and they must be used in each vehicle (exception: SB20-016, SB20-017 does not need to be used in the vehicle).

SB20 number	Component specification	The correspondingly mandatory data versions are stored on the DMSB server (web address) in the file "Reglement-relevante, verbindliche Datensätze" and there in the below defined subfolders under the same file name as below.
SB20-002	Droop stop limiter	Subfolder: SB20-002 droop stop limiter
SB20-003	Skid block	Subfolder: SB20-003 skid block
SB20-004	Rear spoiler lip	Subfolder: SB20-004 standard rear spoiler
SB20-006	Engine plate	Subfolder: SB20-006 engine plate
SB20-007	Cooling core	Subfolder: SB20-007 cooling core
SB20-008	Engine monocoque bracket	Subfolder: SB20-008 engine monocoque bracket
SB20-009	Front adapter plate crasher	Subfolder: SB20-009 adapter plate crasher front
SB20-010	Flange plates (engine)	Subfolder: SB20-010 flange plates
SB20-012	Propshaft flange	Subfolder: SB20-012 propshaft flange

SB20-013	Engine mount	Subfolder: SB20-013 engine mount
SB20-014	Rear restricted volume	Subfolder: SB20-014 rear restricted volume
SB20-015	Cockpit Volume	Subfolder: SB20-015 cockpit volume
SB20-016	Camera dummy K8	Subfolder: SB20-016 Camera dummy
SB20-017	Tire cover parc fermé	Subfolder: SB20-017 tire cover
SB20-018	Car cover parc fermé	Subfolder: SB20-018 car cover parc fermé
SB20-019	Contour shape rear bumper	Subfolder: SB20-019 virtual contour
SB20-020	Gantry	Subfolder: B20-020 Schlauchbrücke/Gantry
SB20-023	Clothing plate	Subfolder:20-023 clothing plate
SB20-024	Flick box	Subfolder: SB20-024 flick box
SB20-025	Wheelhouse front	Subfolder: SB20-025 Wheelhouse front
SB20-026	Wheel arch front	Subfolder: SB20-026 Wheel arch front
SB20-027	Wheel house rear	Subfolder: SB20-027 Wheel house rear
SB20-028	Wheel arch rear	Subfolder: SB20-028 Wheel arch rear
SB20-029	Intercooler	Subfolder: SB20-029 Intercooler
SB20-030	NACA duct driver cooling	SB20-022: NACA duct
SB20-031	mirror stalk box	Subfolder: mirror stalk box

Table 64

22.3 List components

The following listed components (LB20-components) and the corresponding manufacturers/ suppliers are included on the DMSB Technical List and they must be used in each vehicle. If several components are listed by the DMSB under one and the same LB20 number, it is at the discretion of the competitor to choose which of the listed components he wishes to use. In any case, an LB20 component must be used for the specified function.

The use of the pedal damper (LB20-011) is optional.

LB20 number	Component specification	The correspondingly mandatory data versions are stored on the DMSB server (dtm.dmsb.de) in the file "MANDATORY REGULATION DATA FILES" and there in the below defined subfolder
LB20-003	Main relay	Subfolder: LB20-003 relay
LB20-004	Lifelock roof opening	Subfolder: LB20-004 lifelock
LB20-005	Battery/ies	Subfolder: LB20-005 battery
LB20-010	Clutch pressure valve	Subfolder: LB20-010 clutch pressure valve
LB20-011	Damper pedal box	Subfolder: LB20-011 damper pedal box
LB20-013	Clutch shut off valve	Subfolder: LB20-013 Clutch shut-off valve
LB20-014	Gearbox Oil cooler	Subfolder: LB20-014 Gearbox oil cooler
LB20-018	timing transponder	Subfolder: LB20-018 timing transponder
LB20-021	flick box	Subfolder: LB20-021 flick box
LB20-022	net of the Air Condition condenser	Subfolder: LB20-022 net Air Condition
LB20-023	Knee protector	Subfolder: LB20-023 knee protector
LB20-026	Helper spring	
LB20-027	Centering ring	
LB20-028	throttle valve/actuator	Subfolder: LB20-028 actuator throttle valve
LB20-029	Spark plug	Subfolder: LB20-029 spark plug
LB20-030	Rear view camera	Subfolder: Rear view camera
LB20-031	Propshaft flex disc	Subfolder: Propshaft flex disc
LB20-033	Propshaft	Subfolder: LB20-033 propshaft
LB20-064	Wastegate	Subfolder: LB20-064 waste gate
LB20-067	Ignition coil	Subfolder: LB20-067 ignition coil
LB20-117	Torsional vibration damper	Subfolder: LB20-117Torsion vibration damper

Table 65

23 Drawings

No	Drawing specification	Article
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Z24	Transition area spoiler lip/ standard contour	
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Table 66

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