

# SCHEDULE V<sup>©</sup>

## NEW ZEALAND FORMULA FIRST TECHNICAL REGULATIONS 2021 / 2022

### PREAMBLE

MotorSport New Zealand introduced the Formula Vee class in 1975 to provide for an entry-level single-seater race series. The philosophy was quickly embraced and through the intervening years a strong register has worked closely with MotorSport NZ to ensure that the evolutionary changes introduced have not compromised the original aims of the class. The formula is for single-seater open wheel race cars based on standard Volkswagen 1200 Series Type 1 mechanical components – as fitted to NZ model (imported by VW Motors NZ Ltd) 1954-65 sedan cars, being restrictive in specification, to emphasise driver ability as opposed to mechanical advantage. The Formula Vee racing series shall also be known as Formula First, and the cars shall carry a small Formula First identification sticker.

### COMPETITOR RECORD OF AMENDMENTS ISSUED TO THIS SCHEDULE

Use this table to keep a record of all official 'Manual / Challenge Amendments' issued during the season relative to this Schedule;

Amendment Number	Issue/Effective date	Regulation reference	Subject

## 1.0 GENERAL CONDITIONS

- 1.1 This Schedule shall be read in conjunction with the safety schedule as detailed in Appendix Two, Schedule A of the current MotorSport Manual.
- 1.2 All Text changes from the previous issue of this Schedule are highlighted such. Text changes for grammatical and/or formatting reasons are not highlighted.
- 1.3 **Formula First / Vee racing cars:** shall have a valid MotorSport NZ logbook.
- 1.4 This Schedule shall be read in its entirety and shall take precedence over Appendix Two, Schedule A excepting where an item is not specifically covered, in which case Appendix Two, Schedule A as detailed in the current edition of the MotorSport Manual will apply.
- 1.5 **Radio Communication:** between pit and car during any qualifying and races is prohibited.
- 1.6 **Component parts** of the engine, the transmission, the front suspension and the brakes may not be altered, modified or changed, in any way unless specifically authorised hereinafter.
- 1.7 **TECHNICAL ELIGIBILITY AND SAFETY EQUIPMENT ENQUIRY:** Where any doubt may exist in understanding any regulation contained within this Schedule it will be understood that it is the Competitors obligation to enquire as to the correct interpretation. All technical eligibility and/or safety equipment enquiry shall be submitted in writing to:

MotorSport NZ Technical Department  
MotorSport New Zealand Inc,  
P.O. Box 133,  
Paraparaumu, 5032.

**Phone** 04 815 8015    **E-mail** technical@motorsport.org.nz

- All enquiries should detail the article in question and the specific subject matter.
- A written reply will always be given to a written enquiry.
- On matters of technical eligibility and/or safety compliance, a verbal statement will have no validity.

## 2.0 DEFINITIONS

- 2.1 Definition of terms used within this Schedule shall only be referenced from the National Sporting Code, Appendix Two Schedule A, in accord with FIA Appendix J – Article 251 and as detailed below:

**‘Direct replacement’** means a component sourced from another manufacturer, to that of the original manufacturer, which is a ‘direct’ replacement in level of duty, function and design to the component it replaces, and can be fitted without making any additional modifications.

**‘FVANZ’** means the Formula First (Vee) Association of New Zealand; and

**‘Race trim’** means the condition in which the car competes and shall include the driver, all safety apparel, all vehicle fluids and any ballast necessary to maintain weight compliance; and

**‘Schedule A’** means the ‘Driver and Vehicle Safety’ requirements as detailed in Appendix Two Schedule A of the current MotorSport New Zealand Manual; and

'Standard' means as supplied and/or manufactured by Volkswagen.

### 3.0 MSNZ OFFICIAL SEALS / SEALING REQUIREMENTS

- 3.1 Official seals:** The definitive text regarding official seals is detailed in Appendix Two - Schedule A, Article 3.7 of the current MotorSport Manual.
- 3.2 Category 'C' seals** may be applied to the following components or assemblies of components at any time at the sole discretion of the Championship Scrutineer or their appointed representative:
- Engine crankcase halves
  - Engine crankcase to bell housing (not starter motor mounting bolts)
  - Cylinder head to crankcase (only one side required)
  - Differential covers (both sides)
- 3.3** It is the competitor's responsibility to ensure that fixations / flanges are pre-drilled with 3mm holes.
- 3.4 Maintenance requirements:** Should a Competitor require permission to remove a Category 'C' seal for maintenance purposes, it is essential that authorization be sought from the Championship Scrutineer prior to the seal being broken. Away from a Round, all requests **must** be in writing and submitted to the Championship Scrutineer.
- 3.5** MotorSport NZ reserve the right to apply a surcharge for such requests (away from a Round of the Championship) to cover any expenses incurred by its volunteer officials. Refer Championship Articles for Championship Scrutineer contact details.

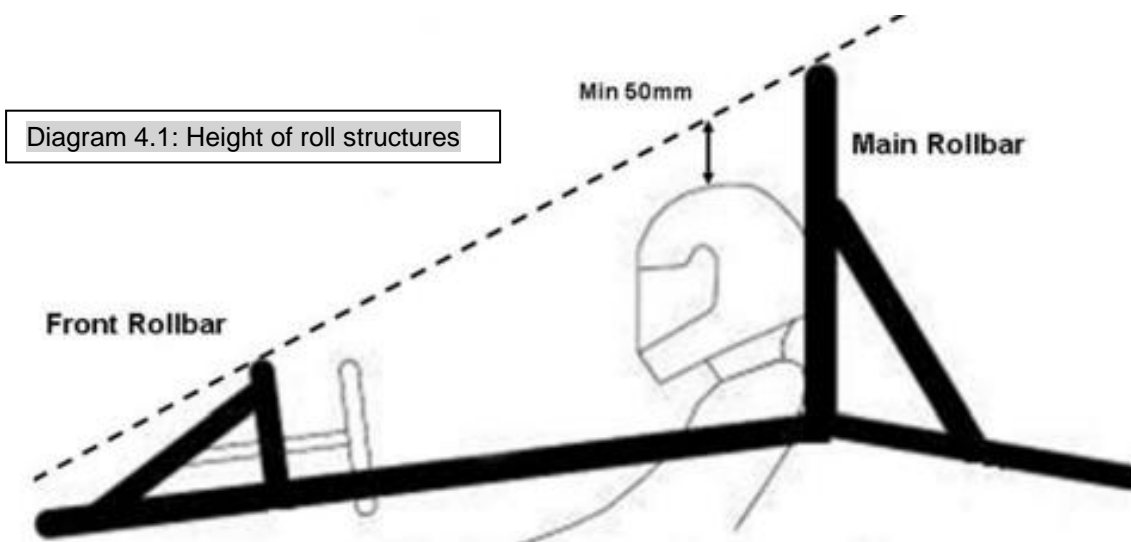
### 4.0 SAFETY EQUIPMENT / SAFETY ITEMS

- 4.1 Roll protection – cars with a logbook issued prior 30 September 2005:** A rollbar shall be incorporated in the design of the chassis frame positioned immediately behind the driver's seat. The top of the rollbar shall be at least 50mm above the top of the driver's helmet when in their normally seated driving position. Additionally, the chassis / frame design should incorporate a substantial support structure (front rollbar) forward of the main rollbar, such that the driver's head will at all times remain below an imaginary line taken between the tops of both bars.
- 4.2 Roll protection – cars with a logbook issued post 30 September 2005:** Two rollbars shall be incorporated, the first being positioned in front (front rollbar) of the steering wheel, not more than 250mm forward of, and at least as high as the top of the steering wheel rim. The second (rear rollbar) shall be at least 500mm behind the first and high enough to provide a minimum of 50mm clearance between the driver's helmet and the top of the rollbar. This measurement shall be checked by drawing an imaginary line between the tops of both rollbars with the driver in their normally seated position (refer Diagram 4.1). The rear rollbar shall have a minimum height of 920mm measured from the base of the seat and a minimum width of 330mm (measured between the two vertical bars at a height of 600mm above the seat base). There shall be at least one rearward brace (same diameter as the rollbar) extending from the top of the rear rollbar at an angle not exceeding 60° with the horizontal. If two rear braces are fitted the tube diameter may be reduced to a minimum of 20mm.

The material shall have a minimum tensile strength of 350 Mpa. Schedule A homologation is mandatory.

**4.3 Roll protection – vehicles with a logbook issued post 30 June 2021:** Designs shall incorporate a Main rollbar (being the principle rollbar), a Front rollbar (being the forward most rollbar) and Lateral Bracing stay/s in compliance with the following:

- (a) The Main rollbar and the Front rollbar shall be positioned symmetrically to the longitudinal centre-line of the vehicle, with the main rollbar positioned rearward of the driver, and the front rollbar positioned forward of the steering wheel, and
- (b) The Main rollbar shall extend transversely across the cockpit with the outer most edge extending at least 100mm beyond the drivers' helmet when in their normal seated position, and
- (c) The minimum height of the Main rollbar shall be dictated by the calculated height necessary to ensure that the drivers' helmet remains 50mm below an imaginary line drawn between the tops of the Main and Front rollbars (refer diagram 4.1), and
- (d) Either two(2) rearward or two(2) forward facing bracing stays shall be fitted with symmetrical connection to the Main rollbar within 150mm of the top bend. Alternatively, a single rearward facing bracing stay is authorised where its top connection is positioned centrally to the top of the Main rollbar. Braces shall exceed an angle of 30° from the vertical and be straight, and
- (e) The bracing stays shall be directly welded or have demountable joints
- (f) The tubes used for the Main and Front rollbars shall be made from SAE 4130 CDS tube or equivalent material and be at least 35mm in diameter and have a wall thickness of at least 2.5mm. The tubes used for the braces shall be of the same material and wall thickness, however the diameter may be reduced to not less than 26mm.



**4.4 Alternative Design:** Safety Cages that may differ from the minimum Material and Design specifications of this Schedule shall be classified as 'Alternative Design'. Constructors shall submit details of their alternative design, to MotorSport NZ for consideration, prior to construction.

All the design variations must be identified; in particular the material specification and dimensions, the optional reinforcing members, and the mounting details. Construction under alternative design shall also require certification by a qualified Engineer, representing the constructor. The design must be shown to withstand the following stress minima in an engineering report with supporting calculations. This report must accompany the Safety Cage Homologation Application.

4.5 A six strap safety harness with current standard shall be installed in compliance with Schedule A.

4.6 The fitment of head restraints and/or padding along the inner top edge of the cockpit opening is highly recommended.

4.7 A fire extinguisher shall be installed in compliance with Schedule A.

4.8 All fluid pipes passing through the cockpit shall comply with Schedule A.

4.9 A high intensity red LED rear rain light which is mandatory to be in operation when the session and/or race is declared 'WET' shall be fitted as follows:

(a) The light shall be operated from the cockpit; and

(b) Approved by FVANZ; or

(c) The light shall be at least 15 watts, or equivalent LED, and

(d) The rain light must have a minimum of 75% of individual LEDs operable; and

(e) The light shall be mounted facing rearwards within 100mm of the car's centreline, and no lower and further forward than the rear axle centreline; and

(f) The light shall be clearly visible 30 Degrees either side of the car's centreline.

4.10 An electrical circuit breaker, easily reached from inside as well as outside the car shall be fitted in compliance with Schedule A. The location shall be indicated by a 'blue triangle / spark symbol' situated on the outside of the car.

**Important Note:** Drivers are reminded of the safety benefits of wearing:

- A Forward Head Restraint (refer Schedule A)
- A neck brace (to help restrict head movement in an impact situation).

## 5.0 FUEL

5.1 **Fuel:** The only fuels permitted are:

- **Unleaded 91 Octane (RON) Regular Grade petrol commercially** available from retail service station forecourt pumps throughout New Zealand and complying with the specifications as detailed in the current edition of the MotorSport Manual, or
- **Unleaded 95 Octane (RON) Premium Grade petrol** commercially available from retail service station forecourt pumps throughout New Zealand and complying with the specifications as detailed in the current edition of the MotorSport Manual, or

- **Unleaded 98 Octane (RON) Premium Grade petrol commercially** available from retail service station forecourt pumps throughout New Zealand and complying with the specifications as detailed in the current edition of the MotorSport Manual, or
- **Unleaded petrol/ethanol blends** commercially available and complying with the specifications as detailed in the current edition of the MotorSport Manual.

**5.2** Additives of any kind, specification or chemical composition shall not be added to the fuel nor may a blend of two or more fuels be used.

## **6.0 RACING WEIGHT AND VEHICLE DIMENSIONS**

**6.1** The **minimum racing weight** is 474 kg.

**6.2** The **racing weight** is the complete weight of the car in 'race trim' which may be measured at any time during the competition, on the official weigh scales of the meeting.

**6.3** **Ballast** may be used to achieve the racing weight requirement. All ballast shall be securely bolted to the interior floor of the cockpit with provision made for the application of official seals as required.

**6.4** **Wheelbase:** The maximum wheelbase is 2220mm and the minimum wheelbase is 2070mm.

**6.5** **Front and rear track:** The maximum front and rear track is 1580mm. The measurement shall be taken between the outermost points of the wheel rims at centre height of the rim, with the wheels steered straight ahead.

**6.6** **Overall length:** The maximum car length is 4070mm (overall length includes all parts of the car).

## **7.0 CHASSIS**

**7.1** The **chassis:** shall be a space-frame design, constructed of steel tubing/box being a maximum diameter/width of 100mm, and shall be of a safe and suitable design. Monocoque construction is not authorised.

**7.2** **Seating position:** With the driver in their normal driving position, no part of their body may extend forward of the front axle centre line. The driver's feet shall be positioned forward of their head.

**7.3** **Cockpit design:** The driver shall be able to enter/exit their seat without the need to remove any part of the car, excepting a quick-release steering wheel. The cockpit design shall enable the driver to exit the car from a belted-in position within 7 seconds in compliance with Schedule A.

## **8.0 BODYWORK AND DUCTING**

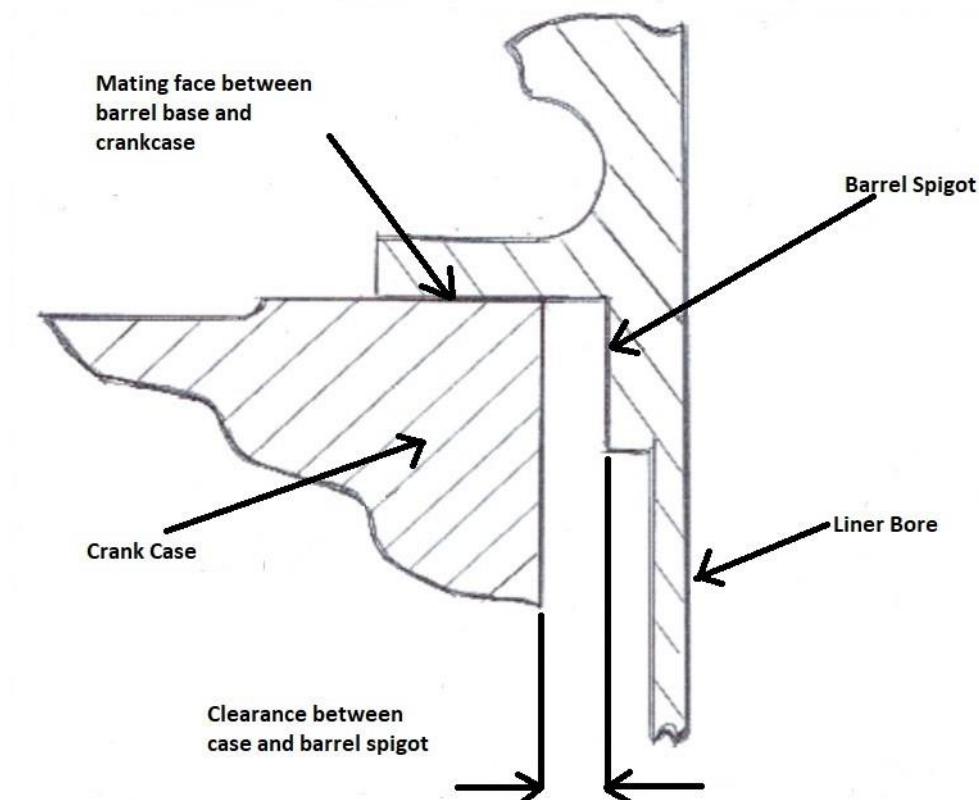
**8.1** **Bodywork:** shall comply with Schedule A and shall incorporate removable panels to permit inspection of all mechanical components. Air intake openings, scoops, ducts, and deflectors may be incorporated into the bodywork.

**8.2** The **body shape** is free, providing no part extends laterally more than 714mm beyond the vehicle's longitudinal centreline.

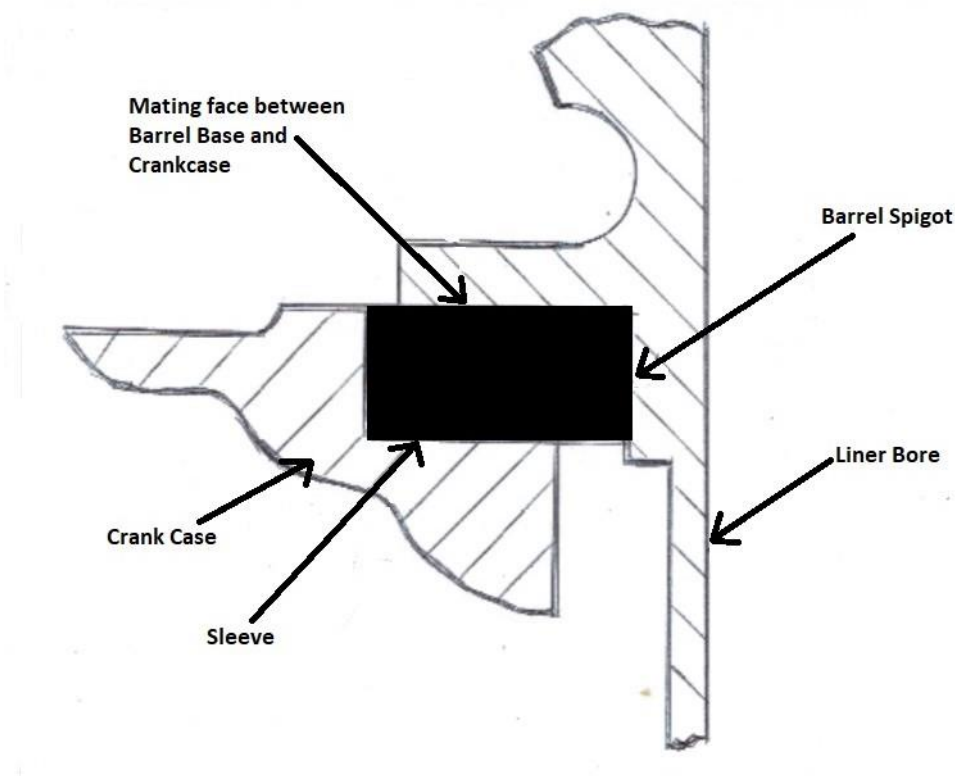
- 8.3** Any **aerofoils / spoilers** shall comply with Schedule A.
- 8.4** A **bulkhead** shall be fitted to provide a sealed firewall between the cockpit and the engine compartment, to a minimum height of 635mm above ground level.
- 8.5** An **engine cover** is optional but recommended.
- 8.6** **Trailing arm rear pivot mounting points:** their position being free.
- 8.7** **Ducting** of air is authorised to the following components / areas:
- Fan intake housing,
  - Carburettor intake (velocity stack/s), however the use of radiators / heat exchangers to cool the air to the carburettor inlet is not authorised, and
  - To the cockpit as desired.

## 9.0 ENGINE

- 9.1** **Engine type:** shall be a standard flat four VW 1200 (41.5 hp) Type 1 engine, as fitted to VW sedans imported by VW Motors Ltd. Any engine part listed by Volkswagen New Zealand as a current or superseded replacement engine part is authorised. Any Type 1 crankcase is allowed. Machining of the crankcase is permitted to allow fitment of inserts to facilitate the installation of VW 1200 cylinder barrels in order for the cylinder barrel to spigot correctly into the crankcase. (*refer figure 9.1(1) [unmodified] and figure 9.1(2) [sleeve inserted] below.*)



**Figure 9.1(1)**



**Figure 9.1(2)**

**9.1.1 Engine mountings:** are free.

**9.1.2 Engine balancing:** Standard reconditioning practice shall be respected when balancing reciprocating and rotating parts of the engine (including the clutch assembly). Component minimum weights shall be respected.

**9.2 Cylinder Heads:**

**9.2.1 Intake Ports** may be modified as follows:

- (a) **Polishing:** The intake port may be polished.
- (b) **Size:** The diameter of the intake port shall not exceed 29mm, measured at the port face.
- (c) **Port Face:** The surface of the head, at the port / inlet manifold mating face, shall remain horizontal. The inlet port may be modified by argon welding provided that the port face is not higher than 12mm above the top of the edge of the rocker cover mounting face and no part of the port (at the port / inlet manifold mating faces) shall extend laterally more than 17mm past the centreline position of the studs affixing the inlet manifold. The centreline of these studs shall remain standard and coincides with the centres of the shroud bolt mounts.
- (d) **Intake manifold 'O' rings:** are optional. The 'O' ring recess in the cylinder head may be enlarged to accept model 'D type' 'O' rings or the recess may be filled.

**9.2.2 The combustion chamber:** flat face and the corresponding cylinder head / barrel interface shall remain as one and the same plane with a tolerance of 0.1mm. The tappet cover and combustion chamber faces may be machined parallel.



**9.2.3 The combustion chamber:** may be modified provided a minimum volume of 39cc is maintained. The following method of measurement shall be employed ensuring that a minimum of 20 minutes has elapsed after the engine has run:

- **Equipment:** Burette, transparent flat plate with suitable holes to allow both filling / air bleeding. Checking fluid, being a 50/50 mix of Kerosene and ATF.
- **Method:** Seal the plate to the cylinder head / barrel interface with a thin smear of grease. Fill combustion chamber from burette to establish volume.

**Note:** *Carbon may be removed from the combustion chamber prior to the measurement being performed.*

**9.2.4 Exhaust ports:** may be polished provided, the diameter of the exhaust port shall not exceed 33mm, within 5mm of the port face.

**9.2.5 Valves:** may be polished and/or contoured. Valve material is free however, titanium valves are not permitted. The following maximum dimensions shall be respected:

- Inlet valve maximum diameter = 31.5mm.
- Exhaust valve maximum diameter = 30.0mm.

**9.2.6 Valve springs & shims:** are free, provided only one spring per valve is used.

**9.2.7 Valve guides:** The guides shall have a nominal bore of 8mm. That portion of guide that extends into the port may be modified or may be removed and contoured to the port.

**9.2.8 Rocker shafts:** Solid aftermarket rocker shafts are authorised. The Standard 'wave' spacers may be replaced with solid spacers. Additionally, the shaft pedestals may be shimmed to enable valve lift adjustment.

**9.2.9 Valve retainers and retainer cotters:** are free, provided they are of ferrous material.

**9.2.10 Rockers:** the following ratios are authorised:

- 1.0 to 1.0, or
- 1.1 to 1.0

**9.2.11 Rocker covers:** may be modified to enable breathing.

**9.3 Cylinder barrels and Pistons:** The following standard dimensions and tolerances shall be respected:

**9.3.1 Nominal Bore:** 77.0mm or 77.5mm.

**9.3.2 Pistons – 77.0mm:** Any flat top piston conforming to VW 1200 specifications can be used. The minimum weight is 260 grams. Pistons shall not be modified excepting as in 9.3.4 and 9.3.5 and for re-grooving to fit ring inserts.

**9.3.3 Pistons - 77.5mm:** Any flat top piston conforming to VW 1200 specifications can be used. The minimum weight is 300 grams. Pistons shall not be modified excepting as in 9.3.4 and 9.3.5 and for re-grooving to fit ring inserts.

**9.3.4 Piston balancing and minimum weight;** may only be achieved by machining the inside of the piston. Pistons are to be weighed without rings, gudgeon pins, gudgeon pin circlips or Teflon bushes, but shall include a ring insert when fitted.

**9.3.5 Piston to barrel (deck height):** At no time shall the piston be less than 1mm below the top face of the cylinder barrel. The deck height may be measured (after a minimum 20-minute cool down period) using a MotorSport NZ approved 1mm step gauge (torqued to 22 ft lbs). An effort of no more than 20 ft lbs applied at the front engine pulley shall enable the engine to be turned through top dead centre (TDC). The method of checking this shall be by the respective piston being brought up to TDC (as close as possible to the step tool) and then the engine must turn over (pass through TDC) with 20 ft lbs of torque or less. Carbon may be removed from the top face of the piston. The spark plugs and rocker gear on opposing cylinders maybe removed prior to performing the measurement.

The 'deck height' may only be achieved by machining any previously machined surface including the top face of the piston, providing that the total surface is machined on the same plane as the previously machined surface, or by placing shims under the cylinder barrels.

**9.3.6 Stroke:** 64.00mm +/- 0.02mm.

**9.3.7 Gudgeon pin circlips** may be replaced by Teflon bushes.

**9.3.8 Compression rings** shall be either a nominal 2.0mm width or a nominal 2.5mm width and of standard VW configuration, but of any make.

**9.3.9 Barrels** may be relieved where they overlap the combustion chamber ends in the cylinder heads.

**9.4 Connecting Rods:** A minimum weight of 460grams shall be respected (weight to include gudgeon pin bush and big end cap / bolts). The big end caps may be dowelled. Polishing is specifically prohibited.

**9.5 Crankshaft:** The crankshaft may only be machined to accommodate standard factory oversize/undersize crankshaft bearings; the case may be machined to accommodate the use of standard factory oversize/undersize crankshaft bearings provided the crankshaft location is not changed. Only the bearing journals may be polished.

**9.5.1 Centre main bearing support:** may be dowelled.

**9.6 Flywheel:** The flywheel may be lightened respecting a minimum weight of 5.443 kg.

**9.6.1 An 'O' ring groove;** may be machined as per standard VW dimensions.

**9.6.2 Dowels;** may be fitted between the flywheel and the crankshaft flanges.

**9.7 Crankcase:** The crankcase may be machined to permit the use of standard VW camshaft bearing inserts, provided that the camshaft location is not changed.

**9.7.1 Oil galleries;** within the crankcase may be enlarged and fitted with threaded end plugs.

**9.7.2 Baffles;** may be introduced provided they are completely housed within the original oil sump and crankcase. Pushrod tube baffles may be installed. Older model crankcases may have the oil baffle beneath the generator tower relieved respecting later model crankcases.

**9.7.3 Oil sump extension;** may be fitted to the crankcase at the oil strainer opening. The extension may be of any size or shape, except it may not protrude beyond the sides and/or end of the crankcase. The oil sump pickup pipe may be extended into the sump extension.

**9.8 Oil pump:** Any VW oil pump is authorised provided it may be fitted without modification to the engine casing. The pump may be modified as follows:

- The rear of the pump body may be machined for an 'O' ring seal.
- The cover plate is free.
- The side port in pump body may be plugged.

**9.9 Oil Coolers and oil filters;** are free. Additionally, an oil temperature sensor may be fitted.

**9.10 Camshaft:** The camshaft is a control part and shall be fitted. The current authorised supplier is:

- **Colt Cams Ltd – Phone: (06) 357 1952**  
**Address: 599-601 Roberts Line, Palmerston North.**

**9.10.1 Camshaft timing;** may be achieved by use of offset keyways in the drive gears.

**9.10.2 Maximum valve lift;** for both the inlet and the exhaust valves is 9.30mm. The valve lift shall be measured after a minimum 20-minute period has elapsed after the qualifying session and/or race finish with the valve stem to rocker clearance unchanged.

**9.10.3** Where the maximum lift is exceeded on any one valve, then the lift of all four respective valves (being either the 4 inlet valves or 4 exhaust valves) shall be averaged. The average lift may not exceed the authorised maximum valve lift. If two inlet or two exhaust valves are found to exceed the maximum valve lift, then the foregoing averaging does not apply.

**9.10.4 A groove or grooves** may be machined into the camshaft gear.

**9.10.5 Replacement camshaft gears;** may be bolted onto the camshaft provided that this does not allow any form of cam timing adjustment once the crankcase has been assembled.

**9.10.6 Cam followers:** are free provided they are solid ferrous (not hydraulic) and respect a minimum weight of 80grams.

**9.11 Fan, fan-housing and engine shrouds:** The following is authorised:

**9.11.1 Standard fan rotors** of either 16 or 28 blade are authorised.

**9.11.2 The standard-fan housing** shape may be modified but must remain fully enclosed except for the base area which shall remain open to the cylinder heads. The base of the housing must extend to at least 75mm from the centreline of each inlet port. Holes may be introduced for the passage of gearbox, clutch and throttle mechanisms and rollbar members. Alternatively, the Standard fan housing may be substituted provided the provisions of this article are respected.

**9.11.3 The Standard engine shrouds** may be removed in part or full.

## 10.0 FUEL SYSTEM

**10.1 Carburettor:** The following make and model of carburettor are authorised:

- Solex 28 PCI, or
- Solex 28 PICT, or
- Brazilian Weber 30BVC, as supplied by Weber Specialists (Auckland)

**10.1.1 Permitted modifications to the authorised Solex carburettor/s:**

- (a) Position:** The position of the carburettor/s is free.
- (b) Replacement jets** and any emulsion tubes are authorised. Adjustable jets are specifically prohibited.
- (c) Accelerator pump:** The removable jet in the accelerator pump nozzle (if used) may be drilled or removed, or if none is present, the nozzle itself may be drilled oversize.
- (d) Venturi:** Direct replacement venturis are authorised for the 28 PCI carburettor/s or a venturi may be omitted entirely.
- (e) Floats:** Any float and float arm may be used. The standard plastic float and arm may be modified.
- (f) Choke shafts / butterflies** may be removed & resulting holes plugged.
- (g) Choke / throttle operating mechanism** may be modified or removed.
- (h) Screws attaching the butterfly to the throttle shaft** may be filed flush with the shaft, but no modification of the shaft or butterfly is permitted.

**10.1.2 Permitted modifications to the authorised Weber carburettor/s:**

- (a) Position:** The position of the carburettor/s is free.
- (b) Replacement jets** and any emulsion tubes may be used. Adjustable jets are prohibited.
- (c) High speed bleed circuit** shall be blanked by Weber Specialists (Auckland).
- (d) Power valve bleed circuit** shall be blanked by Weber Specialists (Auckland).
- (e) Solenoid** shall be removed & the hole plugged by Weber Specialists (Auckland).
- (f) Accelerator pump** and its operating system is free.
- (g) Choke shafts and butterflies** shall be removed and resulting holes plugged by Weber Specialists (Auckland).
- (h) Butterfly and shaft** shall not be modified.
- (i) Throttle operating mechanisms** are free.

**10.2 Intake Manifold:** is free.

- 10.3 Fuel tank:** shall be of a FVANZ approved type and shall be positioned within the chassis / frame between the bulkhead / firewall and the rear of the seat.
- 10.4 Fuel tank breather:** shall be fitted and shall incorporate a one-way valve to prevent fuel spillage. An appropriate fuel tank cap with integral breather and one-way valve may be utilised.
- 10.5 Fuel cooling radiators** are not authorised.
- 10.6 Water injection** into any part of the fuel system is not authorised.
- 10.7** The engine shall be naturally aspirated and forced induction (turbo-charging or super-charging) is prohibited.

## **11.0 EXHAUST SYSTEM**

- 11.1 Exhaust system:** The exhaust system is unrestricted, provided the maximum car length is respected and the exit is at least 130mm rearward of the rear axle centreline.
- 11.2 Noise emission;** as detailed in Schedule A shall be respected.

## **12.0 TRANSMISSION**

- 12.1 Clutch:** Any Standard VW clutch assembly is authorised provided no modification of the bellhousing / flywheel is necessary to enable its fitment. The minimum weight for the Clutch Cover (Pressure Plate) shall be 2.85kg. Balancing refer to article 9.1.2.
- 12.2 Friction linings;** are free.
- 12.3 Operation;** by mechanical or hydraulic means is authorised.
- 12.4 Gearbox / differential assembly;** shall be standard VW 'tunnel case' type as fitted to sedan and transporter models. Lightening of any standard component is prohibited. Oil grooves may be added to the 4<sup>th</sup> gear thrust washer.
- 12.5 Mounting:** The transmission shall be mounted in the chassis directly behind the engine. Any mounting means may be used and mounting at an angle to horizontal is permitted.
- 12.6 Crown wheel gear;** may be transposed to the opposite side of the case to provide proper axle rotation. The transmission may not be inverted.
- 12.7 Synchronesh components;** shall be in place and operating on at least three gears. Third and fourth gear 'dog teeth' may be welded to their respective gears and the 'large tooth' on the 'dog rings' may be removed.
- 12.8 Reverse gear;** shall be operable from the driver's seat.
- 12.9 Differential;** shall be standard and shall function freely. Use of limited-slip type differentials is prohibited.
- 12.10 Vents:** The transmission case may be vented to a catch tank and the baffle of the early model tail housing may be removed.

- 12.11 Exterior of the case;** may be modified to permit attachment of shifter guard, exhaust pipe supports, battery boxes, frame braces, body brackets, etc.
- 12.12 Shifter rod;** may be drilled for securing shift linkage. Any linkage may be used.
- 12.13 Clutch lever and fork assembly;** is free.
- 12.14 Gear ratios:** Only the following gear ratios are authorised:

<b>Gear</b>	<b>Tooth count</b>	<b>Ratio</b>
1 <sup>st</sup>	10 : 38	3.80
2 <sup>nd</sup>	17 : 35	2.06
3 <sup>rd</sup>	22 : 29	1.32
3 <sup>rd</sup> (option)	23 : 29	1.26
3 <sup>rd</sup> (option)	23 : 28	1.22
4 <sup>th</sup>	27 : 24	0.89
4 <sup>th</sup> (option)	28 : 23	0.82
Crown-wheel / Pinion	8 : 35	4.375
Crown-wheel / Pinion (option)	8 : 33	4.125

## **13.0 ELECTRICAL / IGNITION SYSTEM**

- 13.1 Electrical system:** may be either 6 or 12 volt.
- 13.2 Generator and mount:** The mounting 'tower' may be modified providing the generator remains in its original position. The generator armature, brushes, brush holders, field coil and voltage regulator may be removed. The generator housing and its mounting strap are free providing the housing is retained and mounted in its original position.
- 13.3 Distributor:** Any distributor is authorised provided the original drive and location are retained. The advance mechanism may be 'locked'.
- 13.4 Electronic ignition** is authorised provided the LT is triggered within the distributor unit and no variable and/or cockpit adjustment is employed when the car is competing, other than the mechanical or vacuum system contained in the distributor.
- 13.5 Ignition coil:** is free.
- 13.6 Rev limiters / tachometers / shift-lights:** are authorised.

## **14.0 FRONT SUSPENSION**

- 14.1 The front suspension:** shall be Standard VW (link-pin beam) as defined hereinafter, with the following modifications authorised:

- 14.2 Torsion bars:** may be modified and/or one set of torsion bars may be substituted by an anti-sway bar, or a free tie-rod which shall have a satisfactory retention at either end. The rubber seals on the torsion arms may be replaced with thrust washers. The torsion bar to link-pin arms shall remain but may be modified solely for the attachment of the anti-sway bar and/or shock absorber.
- 14.3 Sway bars:** are free.
- 14.4 Shock absorbers (dampers):** are free, as is their position provided, they solely perform a damping function. The Standard top mounts (horns) may be removed.
- 14.5 Front beam:** The front beam to chassis mounting is free and may incorporate adjustment for caster. The rebound bump horns and the pressed metal stanchions separating the axle tubes may be removed, with any resulting holes made good. Where these stanchions are removed an alternative method of retaining the original tube spacing must be employed. The beam tubes may be rotated / bent for caster / camber adjustment in compliance with article 14.7.
- 14.5.1 Front beam (option to 14.5 above):** The manufacture of a new front suspension beam is authorised under the following provisions;
- The beam & stanchions shall be fabricated from steel
  - The main tubes shall be a minimum OD of 50.5mm (nominal OD 2.0")
  - The wall thickness of the tubes shall be a minimum of 3.2mm excluding any machined recesses for bearings
  - The maximum width of the beam shall be 865mm, excluding the suspension arms and spacers
  - Centre to centre distance between the beams shall be 120mm +/- 1mm
  - The beam to chassis mounting is free & may incorporate caster adjustment
  - Shall use a minimum of 1-set of VW torsion bars
  - The beam tubes may be bent for caster / camber adjustments in compliance with Article 14.7.
- 14.6 Castor:** is free.
- 14.7 Camber:** is free, provided adjustment is achieved:
- by varying the spacers on the torsion arms or shims or link pins, and/or
  - by realigning the axle tubes to a maximum deflection of 25.4mm. This measurement shall be checked by placing a 750mm long straight edge parallel to the top of the top axle tube, in the same plane as the deflection and transversely centred.
- 14.8 Attachments to the beam:** Brackets/supports may be fitted to the front beam for the following components: the chassis, a steering box or rack, hydraulic lines, hydraulic reservoirs/cylinders, electrical looms, pedal assemblies, bodywork and aerodynamic shapes.
- 14.9 Ride height adjuster:** Either axle beam may be cut for the installation of a ride height adjuster, provided all the dimensions remain Standard.
- 14.10 Bushes and bearings:** are free.

- 14.11 Front stub axles:** Replacement steering arm / stub axles may be manufactured providing they conform to the Standard VW specifications, excepting the position of the point of connection between the steering arm and the tie rod end, which is free. The steering arm may be strengthened and/or changed side to side.
- 14.12** Wheel spacers compliant with Schedule A are authorised.

## **15.0 REAR SUSPENSION**

- 15.1 The rear suspension / hub assemblies:** shall be Standard VW as defined herein. The type of spring medium may be coil, torsion or leaf design.
- 15.2 Suspension links:** Each axle shall be located by one or more arms pivotally attached to the frame, either forward or rearward of the axle, their design being free. The cross-sectional shape of the material used to fabricate the arms is free.
- 15.3 Coil spring medium and damping:** shall utilise one or more coil over shock units. The units are free provided that not more than one coil spring per shock unit is used. The method of shock unit mounting, and actuation is free.
- 15.4 Torsion / leaf spring medium and damping:** The mounting design is free as is the method of shock unit mounting and actuation.
- 15.5 Axle tube beams:** may have the Standard shock absorber mounts replaced with brackets to support ancillary components.
- 15.6 Camber:** is free.
- 15.7 Sway bar and/or camber controlling devices:** are free. Wheel spacers compliant with Schedule A are authorised.

## **16.0 BRAKING SYSTEM**

- 16.1 A dual circuit braking system** is mandatory, operated by a single pedal. In case of hydraulic failure in either circuit, braking shall be maintained in the other circuit. Air scoops and deflectors are not authorised.
- 16.2 Master cylinders, pedal and linkages:** are free.
- 16.3 The braking system** shall be either:
- (a)** Brake drums, backing plates and wheel cylinders as fitted to Standard VW 1200 sedan models, as defined herein, excepting standard 'five rib' rear drums are authorised. The backing plates may be drilled solely for the purpose of providing shoe adjustment; or
  - (b)** FVANZ approved brake disc assemblies, hubs, mounting brackets, calipers and wheel spacers are authorised to be fitted as a complete package.
- 16.4 Friction materials:** are free.
- 16.5 Hydraulic brake lines:** shall comply with Schedule A.



**16.6 Handbrake components:** may be removed and the resulting holes in the backing plates filled.

## 17.0 STEERING

**17.1 Steering box / rack:** and the location is free.

**17.2 Pitman arm:** is free.

**17.3 Tie rods:** Only one right and one left hand are authorised. Tie rod ends are free.

**17.4 Steering arms:** (tie rod end links) as attached to the stub axles may be modified to provide an alternative tie-rod end position.

**17.5 Steering wheel, shaft and universal joints:** are free.

## 18.0 WHEELS

**18.1 Wheel type:** and offset is free, respecting:

- Diameter = 13 inch (330mm)
- Maximum width = 6 inch (152mm)
- Minimum weight = 5 kg (including washers).

**18.2 Wheel balancing:** shall be achieved only by the attachment of appropriate balance weights.

**18.3 Brake adjuster:** A hole, corresponding to that in the brake drum may be drilled in each wheel for the sole purpose of brake adjustment.

## 19.0 TYRES

**19.1 Tyre type:** Only such tyres as are specified by MotorSport NZ from time to time may be used. The tyre approved for the current season is:

- Maxxis MA-P3 175 / 70 x 13 and 185 / 70 x 13

**19.2 Tyre modification / treatments** as follows are prohibited:

- Hand cut tread grooves.
- Filing, buffing, or any other disguising of the tyre sidewall however, shaving, skimming, and trueing of the tyre tread is allowed.
- Tyre warmers, chemical treatments or any means to attempt to artificially enhance tyre performance.

**19.3 Tyre tread groove depth:** At the commencement of any qualifying session or race all tyres must have a tread pattern, excluding any tie-bar or tread depth indicator strip, of not less than 1.5mm in depth within all principle grooves containing moulded tread depth indicators, and around the entire circumference of the tyre.

## 20.0 AUTHORISED (NON-STANDARD) PARTS

20.1 The following (non-standard) replacement parts are authorised provided no modification is required to enable fitment:

- Fasteners, gaskets and seals (The use of titanium fasteners, fixtures and fittings is prohibited)
- Spark plugs / HT leads / fan belt
- Engine bearings / valve guides of the same specification
- Rocker shafts / spacers
- Oil pump front cover
- Power pulley (of minimum diameter 146mm)
- Rocker covers / push rod tubes and push rods
- Crankshaft gland nut
- Diagonal stays from bottom suspension (rear axle) unit to inner axle to be optional
- Wheel bearings
- Approved fuel / hydraulic lines
- Wiring.

## 21.0 DATA LOGGING / ACQUISITION SYSTEMS

21.1 Data acquisition systems: are free.

END