

1972 SCCA GCR

Formula Vee Section

## 5. FORMULA VEE

### 5.1 Definition

A formula for single-seat, open-wheel racing cars based on standard Volkswagen 1200 series type I, U.S. model sedan (imported by VW) components, and restrictive in specifications so as to emphasize driver ability rather than design and preparation of the car.

No component, of the engine, power train, front suspension or brakes may be altered, modified, or changed, nor be of other than VW manufacture, unless specifically authorized.

Engine components must be assembled in standard configuration. Exceeding the wear limits specified in the VW manual or other official VW guides is not prohibited provided that tolerances, dimensions and specifications stated in the GCR are met.

### 5.2 Weight and Dimensions

Minimum weight, without fuel or driver — 825 lbs.

Wheelbase, Minimum — 81.5"

Wheelbase, Maximum — 83.5"

Track, Front — Standard VW — 51.4"

Track, Rear — 49.8"  $+1/8"$   $-5/8"$

Overall length, Minimum — 123"

Overall length, Maximum — 127"

Body depth at firewall, Minimum — 25"

Body width at firewall, Minimum — 34"

### 5.3 Suspension

a. The front suspension and steering shall be standard VW sedan as defined herein. The following modifications are allowed:

1. Removal of one torsion bar.
2. The use of any anti-sway bar(s) mounting hardware and trailing arm locating spacers.
3. The use of any shock absorber(s) which can be mounted directly on the standard mounts. Spring shocks are prohibited.

4. Relocation of the steering gear box to a central position, and replacement of the tie rods with others of a suitable length.
  5. Steering column may be altered or replaced and any steering wheel may be used.
  6. Use of any desired Pitman arm. Standard steering arms may be altered; however, no modification of the spindle is permitted.
  7. Modification of the standard front torsion bar(s).
  8. The rubber portion only of the bump stop may be altered or removed.
  9. Caster and toe in/out settings are free.
- b. The rear axle assembly shall be standard VW sedan as defined herein with axle location provided by a single trailing arm on each axle. The rear axle tube may be rotated about its axis. Coil springs shall provide the primary springing medium, with telescopic shock absorbers mounted inside the springs. Cables, straps, or other positive stops may be used to limit positive camber. An anti-roll bar or camber control device may also be used. When said anti-roll bar or camber control device is removed the required coil springs must continue to perform functionally.
  - c. Wheels shall be standard 15" x 4J as used on the 1200 cc or 1300 cc VW sedan as defined herein.
  - d. Any tire size may be fitted.

#### 5.4 Brakes

- a. Brake drums, backing plates and wheel cylinders shall be standard VW sedan, as defined herein. Ribbed-type rear brake drums (part no. 113-501 615 D or F) may be used in place of the 1200 series rear brake drums.
- b. These cars shall be equipped with a dual braking system operated by a single control. In case of a leak or failure at any point in the system, effective braking power shall be maintained on at least two wheels. Any master cylinder(s) may be used.

- c. A separate hand brake (emergency brake) is not required. Removal of the hand brake and operating mechanism is permitted.

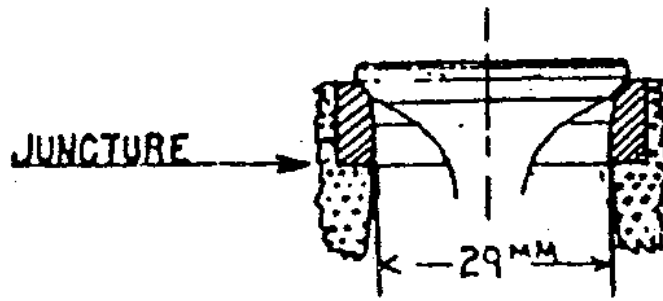
## 5.5 Engine

The engine shall be a standard VW powerplant, as normally fitted to VW sedans as defined herein. Any engine part(s), listed by the manufacturer (VW) as a current, superceding, replacement part for the standard VW 1200 series, type I, U.S. model sedan and interchangeable with the original part(s), may be used.

The engine/transmission shall be mounted in the chassis with the transmission to the rear.

### Allowed:

- a. Removal of the carburetor air cleaner and choke mechanism.
- b. Replacement of standard exhaust system with any exhaust system terminating 1" to 3" behind the rear most part of the body.
- c. Lightening of the flywheel to a minimum of twelve pounds.
- d. Balancing of all moving parts of the engine, provided such balancing does not remove more material than is necessary to achieve the balance. The crankshaft may be ground and the case may be machined to accommodate the use of standard factory oversize/undersize crankshaft bearings, provided the crankshaft location is not changed.
- e. Polishing of the intake and exhaust ports, provided such polishing does not enlarge the exhaust port beyond 33 mm, inside diameter, and the intake port beyond 29 mm, inside diameter. The measurements are to be taken at the juncture of the seat insert and the aluminum port material, and at the manifold face. Valve seat angles must be machined as specified in the official VW Workshop Manual.



- f. Matching of manifold flanges is permitted.
- g. Complete or partial removal of any cooling duct component, except the fan housing. Fan belt origin is unrestricted. The use of a fan belt is optional.
- h. Fitting of any standard VW carburetor originally supplied on above specified engines (Solex 28 PCI or PICT) and the use of any jets or VW venturi which may be fitted without alteration to the carburetor body. The venturi must be fitted in the standard position, but its internal diameter may be machined. The carburetor may be rotated 180° about its vertical axis. A velocity stack may be fitted to the carburetor. Modification of the float is allowed as long as no change is made to the float chamber and/or float valve.
- i. Fitting of any standard VW distributor.
- j. Removal of the intake manifold heat riser tube. Removal of metal from the interior of the intake manifold, provided that the following dimensions are not exceeded:
  - downtube 1.132" O.D. at 2.5" below carb. flange.
  - horizontal tube 0.994" O.D.
- k. Removal of the armature, brushes, brush holders, and field coils from the generator.
- l. The installation of baffles housed completely within the original oil sump and crankcase.
- m. The use of oil temperature indicating device in the crankcase.
- n. The use of any standard VW oil pump.
- o. The use of valve spring shims.

- p. The following standard dimensions and tolerances of engine components are included as information and shall be observed:

Maximum bore: 3.040"

Stroke: 2.520"  $\pm$  0.005"

Minimum capacity of one combustion chamber in head: 43.0 cc.

Minimum depth, top of cylinder barrel to top of piston: 0.039".

The above dimensions may be achieved by machining any previously machined surface, provided that the total surface is machined on the same plane as the previously machined surface.

- q. The use of any VW clutch of the same diameter as fitted to standard VW sedan as defined herein. The standard clutch operating arm may be modified to allow its attachment in any appropriate position.
- r. An oil sump extension may be fitted between the crankcase and the oil strainer cover plate, provided the extension does not extend horizontally beyond the edge of the oil strainer cover plate and the capacity does not exceed 250 cc. The oil pump pickup pipe may be extended into the sump extension.
- s. Replacement of oil galley plugs with threaded plugs.
- t. The following standard dimensions are included for information only and shall be observed:
- Exhaust valve diameter: 1.102" or 1.18"
- Intake valve diameter: 1.18" or 1.24"
- u. The crankcase may be machined to permit the use of standard VW camshaft bearing inserts, provided that camshaft location is not changed.
- v. A VW "D" camshaft, part nos. 113-109-015D, 113-109-017D, 113-109-019D, 113-109-021D, 113-109-023D, 113-109-025D, 113-109-027D must be used. The camshaft profile shall be checked using the official procedure published by SCCA. Cam timing  $\pm$  one (1) degree.

## 5.6 Transmission-Rear Axle

The transmission-rear axle assembly shall be standard VW sedan, as defined herein. The synchromesh components must be in place and operating on at least three gears. Reverse gear must be operable from the driver's seat.

Allowed:

- a. Installation of any standard VW gear set which can be fitted without modification of any component of the transmission or of the gear set itself and the transposing of the ring gear to provide proper axle rotation.

**Fully synchromeshed transmission:**

Gear	Part No.	No. of Teeth	Ratio
1st	113 311 251A	10:38	3.80
2nd	113 311 261	17:35	2.06
3rd	113 311 275	22:29	1.32
	113 311 275B	23:29	1.26
	113 311 275A	23:28	1.22
4th	211 311 341	28:23	0.82
	113 311 341	27:24	0.89
Ring & Pinion	211 517 143A	8:35	4.375
	311 517 143B	8:33	4.125

**Partly synchromeshed transmission:**

Gear	Part No.	No. of Teeth	Ratio
1st	113 309 251	10:36	3.60
2nd	113 309 261A	17:33	1.94
	113 309 261	17:32	1.88
3rd	113 309 275	23:28	1.22
	113 309 275A	22:27	1.23
4th	113 309 341A	28:23	0.82
Ring & Pinion	113 517 141B	7:31	4.43

## Part Numbers

There are different part numbers for various gears in addition to the ones listed here. This in general indicates changes on the parts such as:

Gear	Part No.	Ratio	Difference
4th	113 311 341	0.82	with Key Way
	113 311 341A	0.82	with Splines
Ring & Pinion	113 517 143	4.125	6 mtg. bolts
	311 517 143	4.125	8 mtg. bolts

However, there are no other standard ratios than the ones listed here. A gear removed out of a transmission can be identified by the number of teeth.

- b. Alteration of the shock absorber mounts.
- c. Transmission may not be installed in an inverted position.
- d. The use of a limited-slip differential device is prohibited.

## 5.7 Ballasting

Ballasting is not permitted.

## 5.8 Frame

The frame/chassis shall be constructed of steel tubing of a maximum diameter or width of four inches and be of a safe and suitable design.

There may be no frame/chassis rigidity or strength derived by means other than the frame tubes. Stressed skin, monocoque or semi-monocoque construction is not permitted, except that:

- a. The firewall panel may be rigidly attached to the frame tubes; and
- b. The undertray (belly pan) may be rigidly attached to the frame, provided that the curvature of the undertray, measured vertically from its lowest point to the highest point of its attachment to frame members at its sides, may not exceed one inch.

## 5.9 Body

The body must enclose the engine by surrounding it from a point no higher than the lower edge of each valve cover and extending from the front of the engine to its rear on each side. The top of the rear deck must extend from the back of the firewall to a point 16 inches to the rear of the centerline of the rear axles, but may have air intake openings.

The rear trailing arms, coil springs and shock absorbers may not be faired in by covering or shrouding them away from the airstream. Specifically, the front mounting point of radius pad may be inside the trailing edge of the side body panel so long as the panel does not extend back over the trailing arm itself.

The driver's seat must be capable of being entered without the removal or manipulation of any part or panel. Firewall, floor and safety equipment must conform to the General Competition Rules of the SCCA.

The front suspension uprights (shock absorber mounts), shock absorbers and/or trailing arms may not be faired in by covering or shrouding away from the airstream.

No part of the frame or body shall project beyond a plane connecting the vertical centerline of the front and rear tires.

Air ducting may be utilized, provided it is attached to the body or frame of the car. Ducting may not be made part of or attached in any way to the engine assembly. Wings (airfoils) are prohibited.

Fuel filler necks, caps or lids may not protrude beyond the bodywork of the car.

5.10 The use of the following non-standard replacement parts is permitted provided that no unauthorized modification of any other component results.

Allowed:

- a. Fasteners (nuts, bolts, screws, etc.)
- b. Wiring.

- c. Gaskets and seals.
- d. Brake lines and fuel line.
- e. Spark plugs.
- f. Piston rings.
- g. Wheel bearings.
- h. Connecting rod bearings and crankshaft main bearings of some type and size as standard VW.
- i. Brake shoes and brake-lining.
- j. Valve guides.

#### **5.11 Battery**

The use of any single 6 volt battery is permitted.