1979 SCCA GCR
Formula Vee Section
(RMVR FV2)

5. FORMULA VEE

5.1 Definition

A formula for single-seat, open-wheel racing cars based on standard Volkswagen 1200 series Type 1, 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.

Any external surface of the suspension, brakes and transmission/rear axle may be painted, plated or anodized.

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 as qualified or raced; with driver: 1000 lbs.

Wheel base, Minimum — 81.5″
Wheel base, Maximum — 83.5″
Track, Front — Standard VW — 51.4″
Track, Rear — 49.8″ +⅛″ − ⅝″
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, or an exact replica of the same material and dimensionally identical. 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 gearbox to any position utilizing an appropriate mounting structure and replacements of the tie rods.

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-inch X 4J as used on the 1200 cc or 1300 cc VW sedan as defined herein. Wheels may be balanced only by the use of standard automotive balance weights (adhesive or clip-on). Hub cap clips must be removed.

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, or an exact replica of the same material and dimensionally identical. 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, superseding, replacement part for the standard VW 1200 series, Type 1, U.S. model sedan and interchangeable with the original part(s), may be used. Turbocharging is not permitted.

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

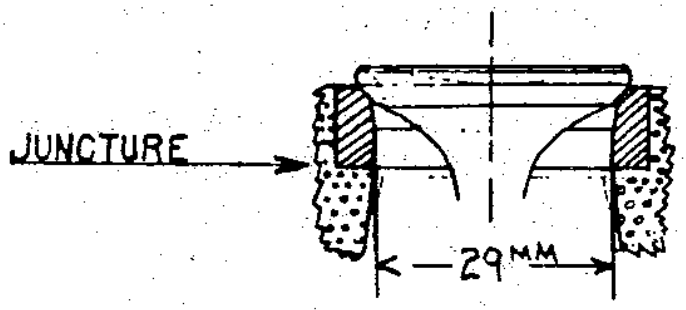
The following component parts may be replaced with that of other manufacture, provided said is of the same material, is dimensionally identical and meets all other tolerances and specifications stated in the GCR:

a. Engine Case
b. Cylinder Heads
c. Cylinders
d. Pistons and wrist pins-minimum combined weight without clips or piston rings=330.0 grams
e. Cam followers-Minimum weight=60.0 grams
f. Connecting rods with bolts and small end bushing-minimum weight=440.0 grams
g. Oil cooler
h. Oil pump-exact replica of any standard VW oil pump
i. Distributor
j. Ignition points
k. Distributor cap
l. Fuel pump-any standard type VW fuel pump which can be fitted without modification of any other part
m. Crankshaft-minimum weight 16.000 lbs. (7.240 kilograms)
n. Crankshaft gear
o. Crankshaft pulley
p. Flywheel
. Pressure plate
r. Clutch disc

s. Throw out bearing
t. Push rods
u. Push rod tubes
v. Valve covers
w. Valve springs

Allowed:

a. Removal of the carburetor air cleaner and choke mechanism.
b. Replacement of standard exhaust system with any exhaust system terminating one to three inches behind the rear most part of the body.
c. Lightening of the flywheel to a minimum of 12 lbs.
d. Balancing of all moving parts of the engine, provided such balancing does not remove more material than is necessary to achieve the balance except on those component parts where weights are specified. 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. Removal of the fan and the fan housing. Fan belt origin is unrestricted. The use of a fan belt is optional.

h. Fitting of any standard Solex 28 PCI or 28 PICT carburetor. The use of any jets. Any venturi of standard VW/Solex dimensions, 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. Modification of the float is allowed as long as no change is made to the float chamber under/or float valve.

i. Fitting of any standard VW distributor (not restricted to 1200 series). Use of any standard 6-volt non-transistorized ignition coil. Mounting location is free.

j. The heat riser tube and heat sink must be removed. Removal of metal from the interior of the intake manifold and the interior rust-proofed provided that the following dimensions are not exceeded:

Down tube — 1.132 inches O.D.
Horizontal tube — 0.994 inch O.D.

These dimensions must be an average of at least four measurements at equal intervals around the tube at any point.

The manifold must not weigh less than 24 ounces.

All exterior surfaces must be in original condition and unpainted but may have a thin transparent coat of rust-proofing material.

k. Removal of the generator. Voltage regulator may be removed.

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 inches
Stroke: 2.520 inches ± 0.005 inch.

Minimum capacity of combustion chamber in head: 43.0 cc.

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

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. The above dimensions shall be the average of all four cylinders.

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 utilizing 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 inches

Intake valve diameter: 1.18 or 1.24 inches

u. The crankcase may be machined to permit the use of standard VW camshaft bearing inserts, provided that camshaft location is not changed. The use of the two-relief valve crankcase, part No. 111-110-025E, is permitted.

v. Where minimum weights are specified, any lightening is permissible provided the original part complied with the dimensional restrictions set forth.

w. A VW "D" camshaft, Part Numbers 113-109-015D, 113-109-017D, 113-109-019D, 113-109-021D, 113-109-023D, 113-109-025D, 113-109-027D, or an exact replica of the same material and dimensionally identical must be used. The maximum lift at the valve spring collar with zero valve clearance is:

Intake — .334 inch, + 0.000 inch
Exhaust — .3165 inch, + 0.000 inch

The camshaft profile must match exactly those which are specified by the official SCCA camshaft plots, plus or minus .002 inch. It is permitted to regrind the camshaft to duplicate (but not exceed) the official SCCA profile. In so doing, the relationship between the centerlines of peak lift at the exhaust/intake lobes shall remain at 214 degrees 15 minutes, plus or minus one (1) degree. (Reference the Official SCCA Camshaft Checking Procedure). The camshaft timing may be changed in relationship to the crankshaft by utilizing an offset key at the crankshaft timing gear. Camshaft timing is free within the restrictions provided under 5.1 or as authorized above. The camshaft profile shall be checked using the official procedure published by the SCCA.

x. Installation of a spark plug hole repair utilizing standard thread repair methods, such as Helicoil, and providing that the spark plug centerline is not changed.

y. A single standard automotive oil filter of not more than one quart total capacity, and a suitable mounting bracket and bypass valve may be installed. Cooling fins are not permitted on any component. Only flexible unfinned one inch outside diameter oil line (maximum length: 12 feet) and suitable fittings may be used. Modification to the lubrication system to facilitate installation of the oil filter is permitted except that the standard oil cooler may not be modified. All components must be contained within the body to the rear of the firewall.

z. Alternate exhaust valves are allowed provided the dimensions and materials are the same as standard (VW) exhaust valves.

aa. Any oil cooler is allowed. A total of 12 feet of one inch O.D. oil line, unfinned, may be used to hook up the oil cooler and the oil filter (paragraph y). A small section of the fan shroud may be cut away to allow the oil cooler adapter to be mounted on the base pad of the standard oil cooler. Oil coolers must be mounted completely inside a

plumb line extending downward from the outermost edge of the coachwork.

bb. An alternate oil pressure regulator spring may be used when original oil cooler is replaced with an alternate oil cooler.

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 &	211 517 143A	8:35	4.375
Pinion	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 &	113 517 143	4.125	6 mtg. bolts
Pinion	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 permitted, per Appendix A, 1.5.

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-monoque 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. It must be possible for the fan housing to be installed within the bodywork in its standard location. The space formerly occupied by the fan housing shall not be utilized for any other purpose except to permit a throttle cable support bracket (provided it serves no other function), and air ducting which must be totally removable. Nothing other than air ducting and removable roll bar braces can be removed or changed to facilitate reinstallation of the fan housing. (It must be possible to reinstall the braces with the fan housing in place).

The rear trailing arms, coil springs and shock absorbers may not be faired in and must be visible and accessible from the side without removal or manipulation of any part or panel. Specifically, the front mounting point of the 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. Any bodywork forward of the center of the torsion bar tubes shall have a maximum width of 31.75 inches (80.645 cm).

Air ducting may be utilized and may be attached to the carburetor. Ducting may not be attached in any way to other parts of the engine assembly. Wings (air foils) 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 (nut, bolts, screws, etc.)

b. Wiring.
c. Gaskets and seals.
d. Brake lines and fuel line.
e. Spark plugs (maximum ½'' reach).
f. Piston rings.
g. Wheel bearings.
h. Connecting rod bearings and crankshaft main bearings of same 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.