



# GENERAL COMPETITION RULES

1981 EDITION

(Abridged to FC Section only)

## 8. FORMULA CONTINENTAL

### 8.1 Definition

Formula C's and Formula Super Vee's have been combined and the new class is named Formula Continental.

### 8.2 Specifications for the ex-Formula C cars can be found in paragraph A.4.A (Formula Atlantic). Additional specifications follow:

#### A. Engines

Engine displacement below or equal to 1100 cc. Cars with rotary piston engines covered by the NSU-Wankel patents will be admitted on the basis of a piston displacement equivalence. This equivalence is twice the volume determined by the difference between the maximum and minimum capacity of the working chamber.

#### B. Minimum Weight

Minimum weight as qualified or raced; without driver: 750 lbs.

#### C. Fuel Tank Capacity

Maximum fuel tank capacity: 16 U.S. gallons.

### 8.3 Specifications for ex-Formula SV (Air Cooled) cars are as follows:

Single-seat, open-wheel racing cars based on standard Volkswagen 1600 components.

No part of the required engine, drive line, brakes or suspension may be altered, modified, changed or be of other than VW manufacture unless specifically authorized herein.

It is permitted to lighten, balance or modify in shape, by tooling, standard VW parts, provided it is always possible to identify them positively as such. It is not permitted to add any material or mechanical extension unless authorized by these Rules.

## **A. Weight and Dimensions**

- a. Minimum weight — 882 lbs., as qualified or raced, without driver.
- b. Wheel base — Free.
- c. Front track — Free.
- d. Rear track — Free.

## **B. Suspension**

- a. Front suspension is free with the exception of the following standard VW-type 1, 2 or 3 parts.
  1. Steering knuckles (upright)
  2. Wheel hubs.
  3. Brake drums, wheel cylinders and backing plates or brake discs and calipers. Splash shields may be removed from disc brakes. ATE caliper type FV/oo2 is permitted.
- b. Rear suspension is free with the exception of the following standard VW Type 1, 2 or 3 parts:
  1. Axle shafts
  2. "U" joints
  3. Wheel hubs
  4. Brake drums, discs, calipers, wheel cylinders and backing plates. Backing plates may be altered for brake cooling. ATE caliper type FV/002 also permitted.

## **C. Wheels**

- a. Wheels are free except that:
  1. Diameter shall be 13, 14 or 15 inches.
  2. Rim width shall not exceed six inches front and eight inches rear.
  3. The bolt pattern shall enable the wheel to be attached directly to the VW hub without the use of an intermediate adapter.
  4. Wheels shall be identical for the right and left front axles, and identical for the right and left rear axles.
- b. Wheel spacers may be installed between the front wheels and hubs, but may not exceed ½ inch per wheel. Spacers are not permitted between the rear wheels and hubs.

- c. Wheel attachment bolts may be replaced with studs.

#### **D. Brakes**

- a. Brake lining and/or brake pad material is free.
- b. Cars must 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. Brake master cylinders are free.

#### **E. Engine**

The engine shall be standard VW 1600 from Volkswagon Type 1, 2 or 3 vehicles or a 1600 cc 127V (Type 4) industrial engine and shall be installed forward of the transmission. The following modifications are permitted:

- a. Induction system:

The induction system is free within the following restrictions:

1. Maximum number of throats: four
  2. Maximum throat diameter at the throttle butterfly: 40 mm (1.575 inches). 35 mm maximum intake venturi size
  3. Fuel injection is prohibited
  4. Turbocharging and/or supercharging are prohibited.
- b. Exhaust system free, but pipes must terminate behind the driver and extend no more than 28 inches rearward of the rear axle centerline. The last four inches must be approximately horizontal and not more than 24 inches above the ground.
  - c. The fan may be altered or removed. The fan housing may be altered or replaced. Cooling ducts may be altered, removed or replaced. The cooling fan may not direct air to the carburetor inlet.
  - d. Any standard VW distributor may be used.
  - e. Generator/alternator — free or may be removed.
  - f. Any oil baffles housed within the original sump may be used. Oil capacity may be increased by sump extension or oil filter(s). Dry sump systems are permitted.

- g. The substitution of valve spring retainers and the use of any valve spring(s) of the same type is authorized.
- h. The following standard dimensions of engine components are included as information and shall be observed.

Bore (Max.): 3.375" (Type 1, 2, 3)

3.4528" (Type 127V)

Stroke: 2.720"  $\pm$  .005" (Type 1, 2, 3)

2.598"  $\pm$  .005" (Type 127V)

Intake Valve — 1.614" maximum diameter

Exhaust Valve — 1.339" maximum diameter

- i. Camshaft including timing gear—free.
- j. The use of any cam followers except for roller type.
- k. The use of any standard VW rocker arms.
- l. Any standard VW clutch. Any clutch lining may be used.
- m. Any oil cooler is permitted.
- n. Any push rods.
- o. The use of alternate pulleys on the crankshaft, fan and/or generator.
- p. The use of alternate valve covers.
- g. The addition of dowel pins between the flywheel and crankshaft.
- r. Bushings may be installed where none are fitted as standard, provided they are concentric and that the centerline of the bushed part is not changed.
- s. Pistons and cylinders 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.

#### **F. Transmission — Final Drive**

Any transmission/final drive assembly utilizing a VW Type 1, 2 or 3 case with four forward speeds and an operational reverse gear may be used. The case may not be installed in an inverted position. Reverse gear must be operable from the driver's seat.

The final drive/differential unit is free except that li-

mitted slip and locked differentials are prohibited. The rear carrier and gearshift housing may be modified or replaced to permit the installation of a "quick-change" final drive assembly.

The final drive covers (side plates) may be modified or replaced.

### **G. Body**

- a. No part of the coachwork and aerodynamic devices shall exceed in height a horizontal plane 90 cm (35.4") above the ground. The safety roll bar/roll cage and the engine air box are not included in this height restriction. Measurements are to be made in any condition, driver on board.
- b. The cockpit opening must have the following minimum dimensions:
  1. Length: 60 cm (23.622 inches)
  2. Width: 45 cm (17.717 inches)  
This width must extend over a length of 30 cm (11.811 inches) measured from the rearmost point of the seat backrest toward the front.
  3. The driver's seat must be capable of being entered without the removal or manipulation of any part or panel.
- c. Bodywork in front of the front wheels and lower than the top of the front wheel rim shall not exceed a maximum width of 135 cm (53.15 inches).
- d. Bodywork in front of the front wheels and higher than the top of the front wheel rim shall not exceed a maximum width of 110 cm (43.307 inches).
- e. Bodywork behind the front wheels shall not extend beyond a plane connecting the vertical centerlines of the front and rear tires.
- f. The material and shape of the bodywork are unrestricted, provided the body is symmetrical to the longitudinal axis of the vehicle and covers the entire length of the engine. The body shall not protrude

- beyond the rearmost point of the gearshift linkage. The carburetor may project outside of the bodywork.
- g. Canards, diveplanes, and "sports car noses" are permitted within the dimensional restrictions of items c. and d.
  - h. Rear-mounted wings are permitted.
    - 1. Height—No part of the wing shall exceed in height a horizontal plane, 90 cm (35.4 inches) above the lowest point of the entirely sprung structure of the car.
    - 2. Width—The maximum width (as viewed from the front of the car) shall not exceed 95 cm (37.402 inches).
    - 3. Setback—Shall not extend rearward more than 80 cm (31.5 inches) from the rear wheel hub centerline.
    - 4. Area—Plan area shall not exceed one-half square meter (as viewed from above).
    - 5. Must be firmly fixed and symmetrically mounted on the fully sprung structure of the car.

#### **H. Fuel Tank**

Fuel tanks must be SCCA approved safety fuel cell(s). The total capacity shall not exceed 10 U.S. gallons. Fuel cells shall be separated from the engine compartment by the firewall and located to the rear of the front wheel centerline.

- I. The use of the following non-standard VW parts is permitted.
  - a. Fasteners (nuts, bolts, screws, etc.)
  - b. Wiring
  - c. Gaskets and seals
  - d. Brake and fuel lines
  - e. Spark plugs
  - f. Piston rings
  - g. Wheel bearings
  - h. Rod and main bearings of the same type
  - i. Fan belt

- j. Brake shoes, pads and linings
- k. Valve (std. valve head diameter must be maintained)
- l. Valve guides
- m. Valve seats
- n. Springs
- o. Battery
- p. Coil
- q. Fuel pump
- r. Oil pump(s)
- s. Ignition point set
- t. Oil and lubricants.

#### **8.4 Specifications for Ex-Formula Super Vee (Water-Cooled Engine) Formula Continental Cars**

##### **A. Car Construction**

A single-seat open wheel racing car based on original VW components.

1. The only original VW standard components which will be accepted are those appearing in the manufacturing company's parts. They must have been subjected to all the manufacturing processes which the company applies to parts for incorporating into standard production vehicles.
2. Other equipment and components are only allowed if expressly authorized by these regulations.
3. All VW components may be reworked according to the details of these regulations only. Any modifications not expressly listed herein are prohibited.
4. It must always be possible to positively identify any reworked parts as VW standard parts. Provided that the origin of a standard part can definitely be established, it may be aligned, balanced, fitted, reduced in size or otherwise reshaped or modified by reworking.
5. Unless authorized by these regulations, no new material may be added in any way to VW parts. Specifically, no material may be added to the engine by welding, adhesive joints, electrolysis, etc. Chassis and body parts, however, may be plated or painted to enhance their appearance.

6. Except for the crankshaft, engine parts may not be nitrided or treated in salt baths.
7. Bolts, nuts, spring washers and other types of washers are free.

#### **B. Weight and Dimensions**

1. Minimum weight — 1000 pounds, as qualified or raced without driver.
2. Wheel base — free.
3. Front track — free.
4. Rear track — free.

#### **C. Suspension**

1. Front wheel suspension is free.
2. The steering mechanism may be of free design.
3. Any form of rear wheel suspension may be used, provided it incorporates standard VW constant velocity joints.

#### **D. Wheels**

1. Any make of wheel rim may be used. The following dimensions are compulsory:
  - a. Diameter: 13"
  - b. Maximum rim width: front— 6"  
rear — 8"
2. Only 4 wheels are permitted. They shall be identical for the left and right front axles, and identical for the left and right rear axles.
3. Wheel spacers may be installed between the front wheels and hubs, but may not exceed one-half ( $\frac{1}{2}$ ) inch per wheel. Spacers are not permitted between the rear wheels and hubs.
4. Wheel attachment bolts may be replaced with studs.
5. All cars shall be limited to two-wheel drive.

#### **E. Brakes**

1. Brake lining and/or brake pad material is free.
2. Cars must 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. Brake master cylinders are free.

3. The following standard VW parts must be used (re-working to fit is permitted):
  - a. Brake disc
  - b. Brake caliper

#### F. Water-Cooled Engine

An engine with a maximum displacement of 1600 cm<sup>3</sup> must be used. It must be made of standard VW components from the engine production series with the following engine code letters: YT, YN, YP, FT, FP, FR, EE, YG, YH, YK, YF, FN, FS and must come from an engine series intended for the Rabbit (Golf), Scirocco or Dasher (Passat).

Valves, valve guides and valve seats are free provided the number of valves per cylinder and distances between valves is not changed. Valve springs, valve spring caps and valve spring washers are free. VW cylinder head bolts must be used. Bolt-on valve covers are mandatory.

Emission control air injection holes in the cylinder head (standard VW U.S. model) may be plugged with standard pipe plugs provided they serve no other purpose than to blank off these external holes.

##### 1. Induction System

- a. not more than two 2-barrel, or four single-barrel carburetors shall be used.
- b. Fuel injection is also permitted, but no form of supercharging shall be used.
- c. Engine speed control must be by means of throttle butterflies.
- d. The intake pipe to each cylinder must incorporate an air venturi with a maximum diameter of **25 mm**. The venturi must be mounted directly ahead of the throttle butterfly, and all intake air for each cylinder must pass through it (or the entire fuel-air mixture, if prepared before this point). **Carburetors to have 30 mm venturi. The fuel injection system and carburetors must employ individual runner in-**

**take manifolds (4) with no plenum or balance pipe.**

- e. Carburetor choke (cold-start) passages are to be sealed with plugs.
2. Cylinder Bore
    - a. Maximum bore size; 3.14 inches (79.78 mm). Piston to cylinder wall clearance is unrestricted for both standard and oversize pistons.
  3. Bearings and Connecting Rods
    - a. Plain bearings may be replaced by others of the same type and dimensions. The distance between the small end and big end bearing centerlines—5.354 inches plus .002 inches (136 mm plus .05 mm)—on production engines must not be altered. Standard VW connecting rods must be used.
  4. Gaskets and Seals
    - a. Gaskets, o-rings and seals may be replaced by other versions or omitted entirely.
    - b. The sealing face of the block may be machined to permit installation of wire sealing rings around the cylinder bore opening only, thereby reinforcing the head gasket.
  5. Alternator may be modified or removed.
  6. Any type of ignition system (except twin spark plugs) may be used.
  7. Camshaft and Valve Gear
    - a. No restrictions are imposed, provided that the position, number and driving system of the camshaft and intermediate shaft are not changed.
  8. Pistons, Piston Pins, Rings
    - a. Any pistons, piston rings and piston pins may be used provided the piston does not project beyond the upper face (sealing face) of the engine block at top dead center.
  9. Other Engine Components
    - a. Engine mountings are free. The fan and water pumps can be modified, replaced or discarded. The coolant circuit is free. In its installed position, the

engine may not be tilted more than fifteen (15) degrees to the right or left from the vertical. The engine must be installed along the vehicle's longitudinal axis.

b. A single dry plate clutch is compulsory. A VW flywheel must be used.

#### 10. Exhaust System

a. The exhaust pipes from all cylinders must lead rearwards. Their actual design or construction is free, provided the tail (outlet) pipes are not higher than 24 inches from the ground. The ends of the pipes must not project by more than 26 inches rearward of the rear axle centerline.

11. Bushings may be installed where none are fitted as standard, provided they are concentric and the centerline of the bushed part is not changed. No component shall be relocated and no prohibited modifications shall result from the use of the above bushing.

### **G. Transmission**

1. A VW gearbox housing incorporating not more than four (4) forward speeds and an operational reverse gear must be used. Reworking to adapt to the VW engine and to accept various gear ratios is permitted. Side plates may be modified or replaced.

2. Limited slip, locking differentials, or fully-locked differentials, are prohibited.

3. The gearbox housing may be rotated through 180°.

### **H. Lubricating System**

1. Dry sump engine lubrication is permitted including the necessary modifications to the crankcase and oil circuit. The oil sump is free.

2. Any oil cooler may be used, but must be supplied through separate oil lines. If rear mounted they must not extend beyond the inner edge of the rear tire or be mounted in a dangerous position.

3. Chassis or frame tubes shall not be used to convey oil.

4. The oil tank must not extend outwards beyond the inner edge of the rear tire.
5. Oil hoses must comply with the standards specified above and the regulations for fuel lines.
6. All engine and transmission vent or breather lines must empty into a transparent oil catch tank or bottle having a minimum capacity of two quarts.

#### **I. Electrical System**

1. Starter. All cars must be fitted with an electrical starter controlled from the driving position.
2. Battery. Any make or type of battery is permitted. (Appendix A 1.5.2)
3. Fuel and Electrical Lines. Fuel and oil lines and electrical cables must not pass through the cockpit together. They must be totally enclosed within a fire-resistant outer jacket or wrapping which is not attacked by liquids (a metal outer cover). No flammable liquid should be able to penetrate the cockpit in any circumstances. Hose unions must also comply with these regulations.
4. Red Warning Light. Each vehicle must be equipped with a rear-facing red warning light of at least 15 watts intensity. This warning light must be mounted as high as possible on the vehicle's centerline, be clearly visible from behind the car and operated from a switch in the cockpit. The warning light must be switched on when called for by the Chief Steward.

#### **J. Bodywork Shape and Material**

1. Vehicle bodywork shape and material are unrestricted. The body may consist of several panels. However, the bodywork must not extend beyond the rear-most point on the rear wing or spoiler. No part of the body or frame may be wider overall than 55.1 inches (1400 mm).
2. The maximum body height is 35.4 inches (900 mm) above the ground under all conditions with driver on board.
3. The bodywork ahead of the front wheels must not ex-

ceed 39.4 inches (1000 mm) measured from the center of the front wheel hub. The maximum width of body sections ahead of the front is 53.1 inches (1350 mm). No part of the body ahead of the front wheels and exceeding the overall width of 37.4 inches (950 mm) may extend upwards beyond the upper edge of a front wheel rim.

4. The cockpit opening must have the following minimum dimensions:

Length: 26.6 inches (600 mm)

Width: 17.7 inches (450 mm)

This width must extend over a length of 11.8 inches (300 mm) measured forward from the rearmost point on the seat back.

The driver must be able to enter or leave the car at any time without any parts having to be removed or manipulated.

5. Rear wings (aerodynamic aids) are permitted subject to the following conditions:

- a. They must be adequately secured to the fully sprung mass of the vehicle and be firmly fixed when the car is in motion. They must be mounted symmetrically to the vehicle's longitudinal axis.

- b. The maximum height of the wing or spoiler from the ground under all conditions (including driver on board) must not exceed 35.4 inches (900 mm).

- c. The maximum width of the wing must not exceed 37.4 inches (950 mm).

- d. The horizontal distance between the rear edge of the wing and the center of the rear wheel hub (rear axle centerline) must not exceed 31.5 inches (800 mm).

6. Front wings or spoilers are permitted under the following conditions:

- a. They must be mounted firmly to the fully sprung part of the vehicle and be adequately secured. They must be mounted symmetrically to the car's longitudinal axis.

- b. They must not interfere with the driver's view when he is seated in the cockpit.
  - c. They must comply with the dimensional restrictions of 8.4.J.3 above.
7. There are no restrictions on the design of the chassis or load-bearing structure (monocoque or spaceframe). The workmanship must provide sufficient strength to resist all loads likely to be encountered when the car is in use and provide an adequate margin of safety.

#### **K. Roll Cage**

1. The roll cage must conform with the requirements of the GCR Appendix Z.
2. The roll cage must be accessible enough to lift the car with a hook or cable.

#### **L. Fuel Tank**

1. Must be a safety fuel cell approved by SCCA.
2. Must be completely enclosed in a container of 20 gauge steel or .059" aluminum and must be isolated from the engine compartment by a fire-proof bulkhead.
3. The tank filler pipe and/or cap must not project beyond the bodywork.
4. The fuel tank cannot be vented into the roll cage. Any air vents must end beyond the bodywork and at least 9.8 inches (250 mm) behind the driver's seat.
5. Any type or make of fuel pump is permitted, but must not be located in the cockpit.

#### **M. Fire Extinguisher**

1. The car must be equipped with an on-board (Halon) fire extinguishing system with a minimum capacity of 5 pounds. The bottle must be mounted so that it can be removed easily for fully-charged verification by weighing.
2. The operating mechanism must be marked with a red circle and the letter "E," and must be accessible to both the driver and a person engaged in rescue work from outside the car. The system must discharge effectively onto the engine as well as the cockpit.