

## **FVAA TECHNICAL BULLETIN**

### **FORMULA VEE TECHNICAL MANUAL VER 4.3**

#### **REFERENCE:**

*MOTORSPORT AUSTRALIA Online Manual of Motor Sport, Section 7, 1<sup>st</sup> Category: Racing Cars, Formula Vee Technical Regulations.*

#### **RATIONALE:**

*To promulgate the Formula Vee Technical Manual, revision 4.3.*

#### **AUTHORITY:**

#### **ACTION:**

*This is the current Technical Manual (Ver. 4.3) for Formula Vee. It replaces and cancels all previous versions and remains in force until any subsequent revisions are released.*

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## Formula Vee Association of Australia

### FORMULA VEE TECHNICAL MANUAL

Issue No: 4.3

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Approved by:

On behalf of the Formula Vee Association of Australia

G Hepburn  
FVAA Technical Director

R Lisson  
FVAA President

**NOTE:**

This document is a controlled document and updated as defined herein. The Specifications contained within this document are to be read in accordance with the MOTORSPORT AUSTRALIA Manual of Motor Sport. Where any discrepancy exists between the present Technical Manual and the MOTORSPORT AUSTRALIA Manual of Motor Sport, the MOTORSPORT AUSTRALIA Manual of Motor Sport shall take priority.

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## DOCUMENT REVISION HISTORY

| Issue Number | Issue Date | Amendment Summary                                                                                                                                                                                                                                                                                                                   |
|--------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|              |            |                                                                                                                                                                                                                                                                                                                                     |
| 1.0          |            | Original                                                                                                                                                                                                                                                                                                                            |
| 2.0          | Draft      | Major revision; update of responsibilities; more detailed definition of procedures, introduction of Certificate of Compliance                                                                                                                                                                                                       |
| 2.1          | Draft      | Amendments to draft Issue 2.0 arising from FVAA meeting 16 October 1995                                                                                                                                                                                                                                                             |
| 2.2          | 4/9/96     | Includes amendments recommended by CAMS                                                                                                                                                                                                                                                                                             |
| 2.3          | 10/9/96    | Amendments including CAMS Bulletin B96/23 and CAMS Eligibility Committee determination of 22 May 1996                                                                                                                                                                                                                               |
| 2.4          | 1/1/01     | Amendments resulting from 2000 FVAA Ballot, recommendations from the FVAA National Committee and CAMS Bulletin B01-12                                                                                                                                                                                                               |
| 3.0          | 22/05/2003 | Major Revision New Specifications for cars Re Ballot and 1600cc engines                                                                                                                                                                                                                                                             |
| 3.1          | 13/10/2003 | Revision to side rail heights, Article 9.4, Bulletin B03/082                                                                                                                                                                                                                                                                        |
| 3.2          | 01/01/2005 | Introduction of Dunlop Tyres                                                                                                                                                                                                                                                                                                        |
| 3.3          | 04/11/2005 | Addition of Safety Roll Bar requirements                                                                                                                                                                                                                                                                                            |
| 3.4          | 10/11/2005 | Revision to Restrictor Plate, 1600cc engines                                                                                                                                                                                                                                                                                        |
| 3.5          | 24/11/2006 | Amend Article 9.1.3(f) 2. Rocker Arms                                                                                                                                                                                                                                                                                               |
| 3.6          | 03/05/2007 | Amend Article 9.2.6 Restrictor Plate                                                                                                                                                                                                                                                                                                |
| 4.0          | 31/10/2014 | Re Write of Manual to:<br>Align the distribution of the FVAA Technical Manual to the current process, remove Technical Specification that are now included in CAMS Manual for Formula Vee and to include additional explanation of the required sealing process.<br>Manual now issued by FVAA and contains no category regulations. |
| 4.1          | 01/06/2016 | Definition of One Piece Construction Added.                                                                                                                                                                                                                                                                                         |
| 4.2          | 01/10/2021 | Add Definition of Standard Interpretation; Appendix D "Accepted VW Australia Standards Specifications List"; Replace CAMS with Motorsport Australia<br>Add requirement to keep a register of Restrictor Plates                                                                                                                      |
| 4.3          | 02/08/2023 | Nominate Tighe Cams as new cam grinder.                                                                                                                                                                                                                                                                                             |
|              |            |                                                                                                                                                                                                                                                                                                                                     |
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# Section 1

## Introduction, Interpretation, Policy & Authority

### 1. SCOPE

In accordance with the MOTORSPORT AUSTRALIA rules pertaining to Formula Vee, this manual shall serve as the basis for all examinations and certification of eligibility of Formula Vee racing cars:

- prior to the sealing of engines and gearboxes
- during pre and post-race scrutineering

This manual defines the approved interpretation of the Formula Vee Regulations as specified in the MOTORSPORT AUSTRALIA Manual of Motor Sport, and wherever appropriate it specifies the procedure through which compliance with specific Regulations shall be measured and certified. No alternative procedure for assessment of compliance with any Regulations may be used.

### 2. DEFINITIONS

The following definitions are used throughout this Manual:

**CAMS** Motorsport Australia

**FVAA** Formula Vee Association of Australia

**STD** State Technical Director

**Regulations:** The Formula Vee Regulations as defined within the MOTORSPORT AUSTRALIA Manual of Motor Sport

**Electronic** having or operating with components such as microchips and transistors that control and direct electric currents:

**One Piece:** A one piece assembly is described as an assembly that is not designed to be dismantled any further for the life of the assembly. If made up of multiple pieces, the sections of the assembly need to be retained together in a permanent manner. (ie. Interference fit, structurally bonded, staked etc.). Fastening two components together via threaded fasteners alone is not considered to be fastened in a permanent manner. The fasteners used to attach two pieces together to make a one piece assembly are to be included in the minimum weight. A one piece assembly can be made up of components of differing material specification.

### 3. DISTRIBUTION

This Manual is issued by the Formula Vee Association of Australia after consultation with MOTORSPORT AUSTRALIA and will be available on the FVAA website at [fvee.org.au](http://fvee.org.au)

This Manual may be copied. Always check for latest update.

### 4. STANDARD INTERPRETATION

The term "VW" means "Australian Volkswagen Type 1". The total assembly or any component of the engine, transmission, rear axle, front suspension, steering or brakes may be modified, replaced or be of other than VW manufacture only as authorised by the Regulations.

Use of the term "standard" in the Regulations shall identify components of VW specification. In the case of a component listed in article 4, "Non-Genuine Parts", it shall be of standard VW function and dimensional specification. VW componentry, both genuine and after-market may be used only as permitted by the Regulations.

Unless authorised by the Regulations, no modified or non-standard part is permitted.

Refer to MOTORSPORT AUSTRALIA Manual for further Definition.

## **5. SPECIFIC INTERPRETATION**

Notwithstanding the standard interpretation, instances occur where clarification or more detailed interpretation is required on specific items.

In such events that a specification of a component is not available from the VW Australia Factory Manual then the NTC will determine from existing genuine componentry what the specification shall be. Such findings will take into consideration configuration and functional dimensions of the component and the findings will be listed in Appendix D of this manual. Additions to Appendix D may be made at any time appropriate without reissuing this Manual.

The following procedures shall apply when seeking and obtaining specific interpretations of the Regulations.

All requests from Association members for interpretations shall be directed in the first instance to the Technical Director in the member's State.

The State Technical Director may either:-

make a determination on more straight forward issues; or  
direct a query to the FVAA National Technical Committee on more contentious issues, who will develop a determination.

The FVAA National Technical Director shall seek an approval of the determination via the FVAA Board of Management.

If deemed relevant by the FVAA Board of Management, the matter will be referred to the MOTORSPORT AUSTRALIA Eligibility Committee.

If the matter is not referred to the MOTORSPORT AUSTRALIA Eligibility Committee, a determination shall be made by the FVAA Board of Management on the basis of the interpretation agreed on by a majority of State Technical Directors. This determination is appealable to the MOTORSPORT AUSTRALIA Eligibility Committee.

The interpretation shall be advised to all State Technical Directors by the National Technical Director and promulgated as a Change Notice to the Technical Manual, such Change Notice to include an update to the Issue No of the Technical Manual. (Refer to Appendix A for Change Notice pro forma.)

The National Technical Director is responsible for ensuring all Change Notices are published on the National website and emailed to all State Secretaries.

If appropriate, the Regulation which required interpretation shall be subject to revision via consultation between the FVAA and MOTORSPORT AUSTRALIA.

## **6. SCRUTINEERING POLICY AND AUTHORITY**

The following scrutineering policy and authority applies to the sealing of Formula Vee engines and gearboxes. The actual sealing procedures relate to specific clauses in the Regulations.

The Formula Vee State Technical Directors at any race meeting he/she may attend is the principal advisor to the Chief Scrutineer of the Meeting on matters of Formula Vee eligibility.

Each State FV Association shall train and appoint a number of authorised "FV Sealers". These Sealers shall be approved by the FVAA Board of Management and included on the FVAA National Website Sealers List.

Sealers shall be responsible to the State Technical Director for execution of their duties in accordance with the requirements of this Manual and the general rules of MOTORSPORT AUSTRALIA.

FV Sealers shall be responsible for verification of conformance of FV engines and gearboxes submitted to them, for fixing approved seals to such items, issuing of Certificates of Compliance, to certify that items are in conformity with the FV Regulations at the time of sealing, and entering details on the Sealing Card.

It shall be the responsibility of each State Technical Director to:-  
ensure that each FV Sealer is trained against the requirements of the FV Regulations and this Technical Manual, as well as the general rules of MOTORSPORT AUSTRALIA:  
ensure that each such appointee undertakes to comply with the requirements of the current issue of the technical Manual as a condition of appointment, and  
ensure that appropriate training updates are undertaken, at least annually, to ensure that consistent procedures are being followed by all FV Sealers.

A Certificate of Compliance shall be issued following the sealing or re-sealing of FV engines and gearboxes. The Sealing Card shall also be updated with the new information. Books of printed "triplicate" forms shall be provided by the FVAA to State Associations for issue to all FV Sealers.

No Sealer may seal the engine or gearbox of any car of which he/she is the owner or likely to be the driver, or of which he/she is the most recent builder/rebuilder of the assembly being sealed.

Sealing shall be done on a rotation or alternation basis, with the proviso that the State Technical Director may direct that the assembly in question is to be sealed by a specific Sealer.

No Sealer shall engage in collusion to seal an engine to provide a material advantage to a particular competitor.

The method by which cars are to be selected for post race or post practice examinations is at the discretion of the Chief Scrutineer, or Stewards of the Meeting.

Each FV Sealer shall be issued with FV numbered seals and tags.

All sealing is to be conducted with equipment detailed in Section 2 of this manual and in accordance with the procedures detailed in Section 3.

A new Certificate of Compliance shall be completed by Sealers each time an engine and/or gearbox is sealed. The standard "triplicate" copies of completed sheets shall be distributed as follows:

Original: To car owner  
Duplicate: To the State Technical Director  
Triplicate: To be retained by the Sealer  
Copy: Sealing data to be sent to National Sealing Director within 7 days.

A Register of Certificates of Compliance shall be maintained by the State Technical Director.

## **7. PLACEMENT OF SEALS**

Seals shall be attached by the Sealer on approved sealing wire in accordance with Section 4 of this Manual so that key engine and gearbox components cannot be replaced or modified.

## Section 2

### Standard equipment required for scrutineering

#### 8 EQUIPMENT FOR SCRUTINEERING

##### *8.1 Equipment*

The following equipment is required for sealing Formula Vee engines and shall be issued to, or readily accessible to all registered Sealers:

50 ml burette for checking combustion chamber capacity.

Perspex disc with one centre hole no larger than 6 mm in diameter for checking combustion chamber capacity.

A small spirit level for setting the cylinder heads level

Vernier calipers for checking basic dimensions, bore, valve and port diameters, valve guide length, etc.

A cylinder gauge manufactured in accordance with Appendix C (or similar) for checking the minimum distance from the top of the piston to the top of the cylinder at TDC and also the engine stroke.

Weighing devices for measuring the weight of specified FV components to an accuracy of 1%.

##### *8.2 Calibration*

It shall be the responsibility of each State Technical Director to ensure that all weighing devices used by registered Sealers are subjected to calibration at least annually, and that calibration curves for each instrument are held by both State Technical Director and the FV Sealer who is the custodian/user of that item of equipment.

In the spirit of maintaining FV as a minimum cost Formula, such calibration may be carried out directly by the State FV Associations. The minimum requirements to be completed in the calibration of each instrument shall be:-

Record zero error (if any) of instrument

Record instrument reading at a minimum of three points over the measuring range, using known weights (retained as standards) for the calibration points. (Calibration weights close to those of the FV items to be measured are preferred.)

After completion of one set of calibrations, repeat the process twice to check repeatability of measurements. Draw a graph of the true readings against the known weights on a single page.

Provided that the repeatability is within 1% at points close to those representing FV components, and provided that the measured values are within 3% of the true reading, this calibration curve may be used to provide corrected results on this item of equipment.

One copy of equipment calibration curve shall be provided to the State Technical Director, and one copy shall be issued to the Sealer who is the custodian/user of that item of equipment.

##### *8.3 Certification of Compliance (engine and gearbox)*

A Sealer shall be required to sign Certificates of Compliance which certify that the measurements, weights and inspections recorded by that Sealer are within the specified limits as measured by the approved measuring equipment used by that Sealer.



## Section 3

### Standard Scrutiny Procedures

#### 9. DRIVETRAIN

The following scrutiny procedures apply to all Formula Vee engines and gearboxes and shall be carried out by registered Sealers. On completion of scrutiny, approved seals are to be secured by the Sealer on approved sealing wire in accordance with Section 4 of this Manual to ensure that the key engine and gearbox components cannot be modified or replaced without removing the seals.

#### 9.1 ENGINES

##### 9.1.1 General

All engine measurements shall be carried out with the components at ambient temperature to avoid errors arising from differential expansion.

The practice of standard reconditioning of serviceable parts is permitted under Regulations. The intent of the rule is to allow second hand parts to be made serviceable. It is not the intent of the regulation to allow the narrowing of gears or the re-profiling of piston skirts to gain an advantage.

The aim of the rules on engines is to allow the minimum blue printing of engine componentry to ensure reasonable equality of engine performance between professional and home built engines at a realistic cost. Standard engine reconditioning practices as carried out by commercial engine re conditioners to make parts serviceable is permitted provided that it does not conflict with the rules. Any machining of previously machined surfaces must be done on the same plane as previous.

##### 9.1.2 Bottom End Build

The following sections detail the checks required as part of bottom end building and in order to complete Build Section B of the Certificate of Compliance.

##### 9.1.2 (a) Crankcase: Refer MOTORSPORT AUSTRALIA Manual

Check crankcase for compliance with Regulations.

Examine the crankcase for machining consistent with normal reconditioning procedures and as allowed by Regulation.

Centering rings, if used on 1200cc engines, shall be checked to ensure that they have a uniform wall thickness so that the 1200 cc cylinder axis is the same as that of the cylinder originally intended for the crankcase.

Check cam follower bore face dimension for compliance with Regulations.

##### 9.1.2 (b) Crankshaft: Refer MOTORSPORT AUSTRALIA Manual

Check crankshaft for compliance with Regulations. Stroke shall be checked through the procedure defined in clause 9.1.3 (h) below.

Check that metal has not been added, and that no polishing has been carried out except on moving contact surfaces. (NOTE: polishing means to make smooth and shiny).

Check crankshaft weight for compliance with Regulations. Crankshaft weight as specified includes all flywheel dowels in each hole in the crankshaft, Camshaft drive gear and woodruff key, distributor drive gear spacer, distributor drive gear, drive gear circlip, and no. 3 main bearing.

For 1600cc engines, other than that consistent with that required for balancing, any material removed must be in accordance with the Regulations.

**9.1.2 (c) Flywheel: Refer MOTORSPORT AUSTRALIA Manual**

**Note 1600 cc engines must use flywheel to suit 200mm clutch p.c.d.**

Check flywheel weight for compliance with Regulations.

**9.1.2 (d) Connecting Rods: Refer MOTORSPORT AUSTRALIA Manual**

Examine all four (4) connecting rods, and check that connecting rod weights comply with the specification in Regulations.

**9.1.2 (e) Camshaft Followers: Refer MOTORSPORT AUSTRALIA Manual**

Check cam followers for compliance with Regulations. The only machining allowed is to the Camshaft contact face.

**9.1.2 (f) Camshaft: Refer MOTORSPORT AUSTRALIA Manual**

Camshafts shall be from the nominated supplier:

**Ivan Tighe Pty Ltd**

47 Westgate Street, Wacol, Qld. 4074

P.O. 3428 Mount Ommaney, Qld, 4074

Tel (07) 3271 6001 Email [sales@tighecams.com.au](mailto:sales@tighecams.com.au)

The Camshaft profile is required to meet the specification in the Regulations and herein. The control camshaft grind, formerly known as the Wade/Clive 1038, **shall be the Tighe 1255.**

New and re-ground Camshafts must be presented sealed.

If the Camshaft of an engine is to be re-used, the cutting and removal of the case approved FVAA Seal must be performed in the presence of an engine sealer, who then either seals the Camshaft or retains it until required for installation.

The seal number of the Camshaft shall be recorded by the sealer and included in Build Section B of the Certificate of Compliance. Remember to do this before the crankcase is sealed.

The valve timing of the assembled engine is no longer specified. It is permissible to vary the engine valve timing of the assembled engine by the method defined in the Regulations.

Un-sealed Camshafts shall be returned to the nominated supplier for verification and sealing.

**Lobe Lift Table maximum (mm):**

| Degrees    | Inlet | Exhaust |
|------------|-------|---------|
| 90 opening | 0.061 | 0.165   |
| 75         | 0.266 | 0.353   |
| 60         | 0.651 | 0.700   |
| 45         | 2.552 | 2.448   |
| 30         | 5.297 | 5.017   |
| 15         | 7.152 | 6.793   |
| 0 peak     | 7.778 | 7.391   |
| 15 closing | 7.154 | 6.787   |
| 30         | 5.310 | 4.993   |
| 45         | 2.596 | 2.364   |
| 60         | 0.679 | 0.632   |
| 75         | 0.310 | 0.288   |
| 90         | 0.118 | 0.081   |

**9.1.2 (g) Bottom End Sealing**

Sealing of the bottom end shall be carried out as defined in Section 4 of this Manual.

### **9.1.3 Top End Build**

The following sections detail the checks required as part of top end building and in order to complete Build Section A of the Certificate of Compliance.

#### **9.1.3 (a) Pistons & Gudgeon Pins Refer MOTORSPORT AUSTRALIA Manual**

Examine all four (4) pistons/gudgeon pin assemblies and ensure that any machining undertaken for balancing is in accordance with the Regulations, and that weights and dimensions comply with the specification in the Regulations.

#### **9.1.3 (b) Cylinder Bore**

Measure the bore of all four cylinders and check that the measurements comply with the maximum dimensions specified in the Regulations.

#### **9.1.3 (c) Cylinder Head - General Refer MOTORSPORT AUSTRALIA Manual**

Examine each cylinder head and check compliance with the Regulations.

Examine closely the combustion chamber, the inlet and exhaust ports of the cylinder heads and check for signs of material having been added, and, in the case of 1600 engines, removed. Note: Isolated "spot" removal of casting dags and occlusions using a punch or chisel only is permitted. Check that any machining of the combustion chambers is only on the same surface as the cylinder spigot contact face and within the limits specified in the Regulations.

Check that inserts do not exceed the specification in the Regulations.

Check that valve guides are replaced in standard position and that the guides are centrally drilled. To be deemed eligible under the existing rules, the position of valve guides in the cylinder head must be that demonstrated on standard Volkswagen component. That is, valve guides with shoulders must be pressed into the cylinder head "all the way home"

Check that no artificial turbulence devices have been fitted in the inlet tract.

#### **9.1.3 (d) Cylinder Head - Ports Refer MOTORSPORT AUSTRALIA Manual**

Check port diameters, valve seats and valve seat. angles and valve guide dimensions and depth for consistency with dimensions specified in the Regulations.

#### **9.1.3 (e) Combustion Chamber Volume Refer MOTORSPORT AUSTRALIA Manual**

Check combustion chamber volume. The minimum volume of each combustion chamber is as specified in the Regulations. This shall be measured as follows:

Insert a spark plug with the correct reach (Bosch W8AC or equivalent) and with only one gasket fitted. Tighten to correct torque

Using a spirit level, position and firmly fix the cylinder head such that the cylinder spigot contact surface is horizontal.

Clean the combustion chamber cylinder spigot contact surface and ensure the combustion chamber surface is dry.

Coat an area of the Perspex disk equivalent to the top of the cylinder spigot with just sufficient light grease or Vaseline to create a seal between the disk and the cylinder spigot contact surface.

Place the disk into the combustion chamber so that the grease or Vaseline provides a seal between the disk and the cylinder/Head sealing face.

Using the burette, meter out the required amount of fluid to fill the combustion chamber to the bottom of the hole in the Perspex disk correcting for the shape of the meniscus.

Check that there has been no leakage of fluid out past the valves, spark plug or the edges of the Perspex plate.

The above test shall be repeated if any leakage or spillage occurs. The volume of fluid metered into the combustion chamber as described above without any leakage or spillage must be at least the volume specified. The volume can be increased to this amount only by fitting thinner valves, recessing the valve seats or by secondary fly cutting of the cylinder head as permitted in the Regulations.

The combustion chamber volume shall be determined as follows:

The procedure is to measure the cc capacity of both combustion chambers and take their average, then, from the table (Weights and Dimensions) determine the required deck height (the distance from the top of the piston to the top of the barrel). The barrel is then shimmed to meet the required deck height. No more than 0.5 mm thickness of paper shims may be used, the remainder must be made of metal.

### **9.1.3 (f) Valve Train: Refer MOTORSPORT AUSTRALIA Manual**

Remove at least one Inlet and one exhaust valve.

Check that the valve sizes and valve seat angles conform to the specification in the Regulations, and examine for any unauthorised machining of the valve especially in the valve seat area.

Check that valves are to the same functional dimensions as standard VW valves, noting that the definition of "functional dimension", when considered in relation to engine valves, requires that valves shall use the same materials as those used by VW for both the heads and stems of valves, and shall have the same valve profile between the stem and the valve seat as standard VW valves since variation in this profile can confer an advantage in operation.

Check rocker arms for compliance with the Regulations.

The rocker arm ratio shall be defined as the tappet side lever arm length divided by the pushrod side lever arm length.

The tappet side lever arm length shall be defined as the mutually perpendicular distance between the axis of the rocker shaft and the axis of the tappet adjusting screw.

The pushrod side lever arm length shall be defined as the perpendicular distance from the centre of the hemi-spherical pushrod seat to the axis of the rocker shaft.

### **9.1.3 (g) Clearance from Top of Piston to Top of Cylinder (deck height)**

After installing each piston and corresponding cylinder, check the distance from the cylinder spigot to the top of the piston with the piston at top dead center, using a clearance gauge manufactured in accordance with the drawing shown in Appendix C, or similar.

Use a Vernier or digital caliper to obtain measurements.

Install the clearance gauge

Rotate the engine until the piston on the cylinder to be measured is at TDC.

Adjust the Vernier or digital caliper until the probe just touches the top of the piston, then read the dimension recorded by the caliper; Dimension (A).

Measure the thickness of the clearance gauge plate, and subtract this from the dimension (A) to obtain deck height.

### **9.1.3 (h) Crankshaft Stroke**

Install the clearance gauge.

Rotate the engine until the piston on the cylinder to be measured is at TDC.

Adjust the Vernier or digital caliper until the probe just touches the top of the piston, then read the dimension recorded by the caliper; Dimension (A).

Rotate the crankshaft until the piston is on the bottom of the stroke.

Adjust the Vernier or digital caliper until the probe just touches the top of the piston, then read the dimension recorded by the caliper; Dimension (B).

Subtract dimension (A) from dimension (B) to obtain the stroke measurement.

The cylinder heads may be installed and tensioned down after the cylinder height of each cylinder has been adjusted to obtain required dimensions and the stroke length has been checked as detailed above.

### **9.1.3 (I) Top End Sealing**

Sealing of the top end shall be carried out as defined in Section 4 of this manual

### **9.1.4 Inlet Manifold: Refer MOTORSPORT AUSTRALIA Manual**

Inspect the inlet manifold. For 1200cc engines, a controlled manifold unmodified must be used with aluminum gaskets.

For 1600cc engines refer to MOTORSPORT AUSTRALIA manual.

### **9.1.5 Fan Housing and Ductwork: Refer MOTORSPORT AUSTRALIA Manual**

Inspect the fan housing and ductwork to ensure compliance with this Regulation. Make sure that the internal deflector is unmodified.

### **9.1.6 Generator: Refer MOTORSPORT AUSTRALIA Manual**

The generator is not required to function. The generator body must be retained and the fan must remain driven by the generator shaft.

## **9.2 CARBURETTOR Refer MOTORSPORT AUSTRALIA Manual**

### **9.2.1 Carburettor Top (1200cc only)**

Inspect the throttle top. The only modification permitted to the carburettor top is the removal of casting flash at the base of the carburettor top where it meets the carburetor body, such that the width of a scrape removing any flash shall not exceed 1mm.

### **9.2.2 Throttle Shaft (1200cc only)**

Inspect the throttle shaft for unauthorised modification.

### **9.2.3 Throttle Body (1200cc only)**

Inspect the throttle body for unauthorised modification.

Removal of excess casting flash within the throttle body is permitted provided that the basic dimensions of the carburetor body are not altered. Check the diameter at the base of the carburetor.

### **9.2.4 Air Cleaner**

Check compliance with Regulations.

### **9.2.5 Carburetion (1600cc engines) Refer MOTORSPORT AUSTRALIA Manual**

The removal of the choke mechanism and plugging of the holes is permitted. Plugs must be flush with the inner surface of the carburetor top.

The fuel cut off solenoid may be removed and a screw in plug fitted.

The carburettor must remain standard. No metal shall be removed from the carburettor casting.

### **9.2.6 Restrictor Plate (1600cc engines) Refer MOTORSPORT AUSTRALIA Manual**

The restrictor plate shall be provided by the Formula Vee State Technical Director. The orifice shall be inspected to ensure that the throat edges are sharp and have not been radiused nor chamfered in any way. The restrictor plate shall be anodised red and be validated by the attachment of an FVAA seal after anodising. The Restrictor Plates are a controlled item with a nominal 29mm hole in the centre and must not be modified in any way. Each State Eligibility Scrutineer shall keep a record of the seal numbers of the restrictor plates and to whom the plate has been issued to, along with the date that the restrictor plate was last checked for compliance. The restrictor plates should be checked routinely through the year, preferably at the beginning and end of year.

### **9.2.7 Inlet Manifold Casting**

Inspect the inlet manifold castings for unauthorised machining or metal removal.

## **9.3 GEARBOX Refer MOTORSPORT AUSTRALIA Manual**

Check compliance with Regulations.

With gearbox dismantled, examine the ratios and ensure that they are consistent with those specified in Regulations.

Ensure that no gears are straight cut except reverse gear and that gear dimensions are standard.

Ensure that synchromesh is present on at least top, third and second gears.

## **9.4 SUSPENSION Refer MOTORSPORT AUSTRALIA Manual**

### **9.4.1 Tyres**

Check compliance with Regulations.

### **9.4.2 Suspension**

Check for compliance with Regulations.

### **9.4.3 Steering**

Check that steering rack is securely mounted, and that is purely mechanical in operation i.e. no power assistance.

The reinforcement of the LH stub axle by the fitment of a 8mm HT (Grade 10.9 min) bolt and nut is compulsory.

### **9.4.4 Brakes**

Check for compliance with Regulations.

### **9.5        *NON-GENUINE PARTS***

Refer MOTORSPORT AUSTRALIA manual

### **9.6        *AUTHORISED PARTS***

Refer MOTORSPORT AUSTRALIA manual

### **9.7        *WEIGHTS AND DIMENSIONS***

Refer MOTORSPORT AUSTRALIA manual

## Section 4

### Sealing and certification procedures

#### 10. SEALING

##### 10.1 *Sealing Requirement*

Seals shall only be affixed by authorised FV Sealers appointed in accordance with Clause 6 above. Prior to affixing seals the FV Sealer shall ensure that compliance is checked in accordance with each applicable clause of this Manual

##### 10.2 *Placement of Seals*

The following is the recommended placement for seals.

###### Engines:

One seal at the flywheel end of the engine on sealing wire between the two halves of the crankcase through appropriately drilled holes. For 1600 engines fitted with a counter weight crankshaft, a small metal tag stamped CC must be placed on the sealing wire prior to the seal being fitted. On each head, one seal on sealing wire between two appropriately drilled head nuts.

###### Gearboxes:

One seal on sealing wire between the tunnel case and gear carrier section on tunnel type gearboxes  
One seal on sealing wire between halves on split gearboxes

For gearboxes used in combination with 1600cc engines, a small metal tag stamped 26 must be placed on the sealing wire prior to the seal being fitted to the gear carrier. Also the left hand differential plate (starter motor side) must be sealed.

This shall be done by fitting a sealing wire through a hole in a stud that holds the differential plate on, and a hole in the case. In the event that the stud has been replaced by a bolt, then the bolt will be cross drilled for the sealing wire.

Both the 4.125 and the 4.375 differentials have an 8 tooth pinion, ensure the 33 tooth crown wheel is fitted, not the 35 tooth of the 4.375.

##### 10.3 *Certificate of Compliance for engine and gearbox.*

When all items have been verified as conforming to the Regulations, a Certificate of Compliance shall be completed by:

filling in all boxes relevant to the inspection only recording new seal numbers and signing the form

When complete the triplicate copies of the Certificate shall be issued as follows:

Original: To car owner  
Duplicate: To the State Technical Director  
Triplicate: To be retained by the Sealer  
Copy To the National Sealing Director within 7 days

The Sealing Card shall be filled in and signed

For new engines or gearboxes, refer following section 'Sealing Card System'



## **Sealing Card System**

In accordance with the Formula Vee regulations in the MOTORSPORT AUSTRALIA manual, all engines and gearboxes must have a valid Sealing Card.

With the sealing card system, each Formula Vee engine and gearbox will be given its own unique engine or gearbox FV number. This will allow for greater transparency and accountability in the tracking of an engine or gearbox sealing history.

Competitors should treat the Sealing Card with the same respect as the vehicles log book. In the event of an engine or gearbox being sold, brought, lent or borrowed, the sealing card must accompany it.

### **Procedure for issuing a Sealing Card and unique FV number.**

For engines and gearboxes the seal number on the case at the time of issuing the Sealing Card will become the FV engine / gearbox number. The number must be stamped onto the case as per the locations illustrated below. (Filling out a new Sealing Card – initial build

Once an engine or gearbox has had a FV number stamped onto it, it then has that number for the life of the engine/gearbox case. Any evidence of removal of the FV number from the case will deem the case an ineligible component and the STD may take further investigation and action if required.

### **In the event of a lost card -**

The engine / gearbox's owner should notify the STD and produce the current sealing certificate. The STD will then check the past sealing history and issue a new card with the previous seal numbers and sealers names. In the event that the sealing certificate cannot be produced nor a copy found by the STD, then the engine will be declared ineligible. It is advisable to keep Sealing Certificates separate from Sealing Card as proof of Sealer is of utmost importance in the event of a Sealing Card being lost.

### Filling out a new Sealing Card – initial build

- 1) Cross out either engine or G/Box, which ever does not apply.
- 2) Record the current case seal number at the top of the card for the initial issuing of the card. This number should then be stamped onto the case in the appropriate place. For engines, on the side of the flange holding the oil filler tube. For gearboxes, adjacent to the original number. (as illustrated below)
- 3) Record month & year of Sealing Certificate
- 4) Record Sealing Certificate Number
- 5) Record position of seal, for engine either case or head (Hd 1&2 or 3&4.), and case or diff, for gearbox. Then record the actual seal number.
- 6) Print sealers name
- 7) Sealer then initials card

#### FVAA Sealing Record Card

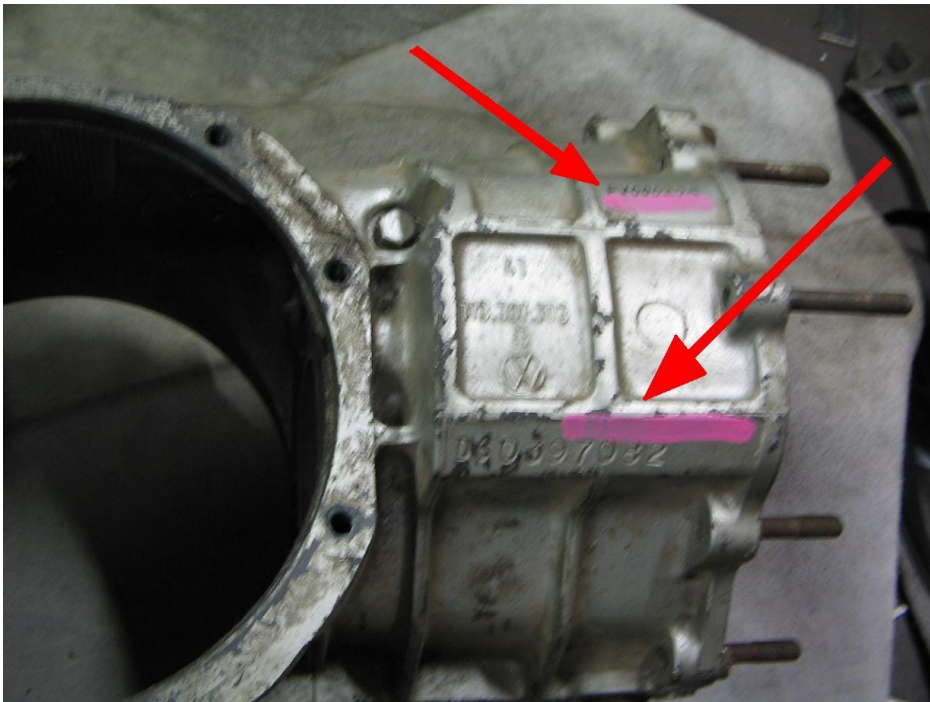
FVAA Engine ~~G/Box~~ No: FV 006383

| DATE  | CERT. No. | SEAL No. & LOCATION    | SEALER NAME  | INITIALS |
|-------|-----------|------------------------|--------------|----------|
| 2/08  | 00151     | CASE FV006383          | A LONGFELLOW | AL       |
| 2/08  | 00151     | Hd. FV006464/FV007321  | " "          | AL       |
| 5/08  | 02717     | Hd. FV007329/FV007444  | J SMITH      | JS.      |
| 10/08 | 03621     | CASE FV 007531         | G LARGE      | GL.      |
| " "   | " "       | Hd. FV007222/FV007821  | " "          | GL.      |
| 12/08 | 00177     | Hd FV 006448/FV006532  | A LONGFELLOW | AL.      |
| 12/08 | 00278     | Head side 1&2 FV007334 | J SMITH      | JS       |
| 1/09  | 03643     | Hd. FV007123/FV007627  | G LARGE      | GL.      |
|       |           |                        |              |          |
|       |           |                        |              |          |

#### FVAA Sealing Record Card

FVAA Engine ~~G/Box~~ No: FV 000225

| DATE  | CERT. No. | SEAL No. & LOCATION | SEALER NAME  | INITIALS |
|-------|-----------|---------------------|--------------|----------|
| 11/05 | 00102     | CASE FV000225       | A LONGFELLOW | AL.      |
| 11/06 | 00102     | DIFF FV 000371      | A LONGFELLOW | AL.      |
|       |           |                     |              |          |
|       |           |                     |              |          |
|       |           |                     |              |          |
|       |           |                     |              |          |
|       |           |                     |              |          |
|       |           |                     |              |          |



## **Section 5**

### **Certification of Chassis**

#### **Certification of Chassis**

**To obtain a Certificate of Compliance, the owner of the vehicle contacts the STD (or nominee) to organize an inspection.**

**The vehicle is inspected to ensure it complies with the Regulations detailed in the MOTORSPORT AUSTRALIA manual.**

Once assessed as being compliant, the STD fills in and signs the Certificate of Compliance – Chassis (refer Appendix B)

Certificate is to be retained by the Owner.

**Appendix A: Change Notice Pro Forma**

**Formula Vee Notification of Change  
To  
Technical Manual**

1. Changes to the FV Technical Manual have been approved which will update the Issue number from:-

Issue .....  
to Issue .....

The update manual can be read or downloaded from the FVAA website.

3. These changes require the following action for printed copies.
- a. Replace the Cover Sheet and the Document Revision History Page of Issue \*\*\* with the Cover Sheet and Document Revision History Page of Issue from the new Manual on the FVAA website.
  - b. Replace Page(s) ...of Issue ... with the attached replacement Page(s) ... of Issue ...

Authorised by: \_\_\_\_\_ (FVAA National Technical Director)

Date: \_\_\_\_\_



## **FORMULA VEE ASSOCIATION OF AUSTRALIA.**

### **Certificate of Compliance**

This is to certify that car:-

Make: .....

Model: .....

Year: .....

Chassis No: .....

Car Owner: .....

has been examined by an authorised officer of the Formula Vee Association. and found to comply with the Regulations for eligibility as a Formula Vee racing car.

Name: ..... Position: .....

Signed: ..... Date: ..... / ..... / .....

## Appendix C: Details of Cylinder Gauge

This fitting is constructed in 3 parts.

The "cylinder plate" is surface ground on both sides. The thickness of the "cylinder plate" is measured accurately (to within 0.01mm or better) and this measured thickness is stamped onto the side of the plate as a permanent reference.

The "top plate" is bolted permanently to the "cylinder plate" with 3 cap screws. The "clamp plate" is loosely attached to the top plate and retained by 1/4" cap screws.

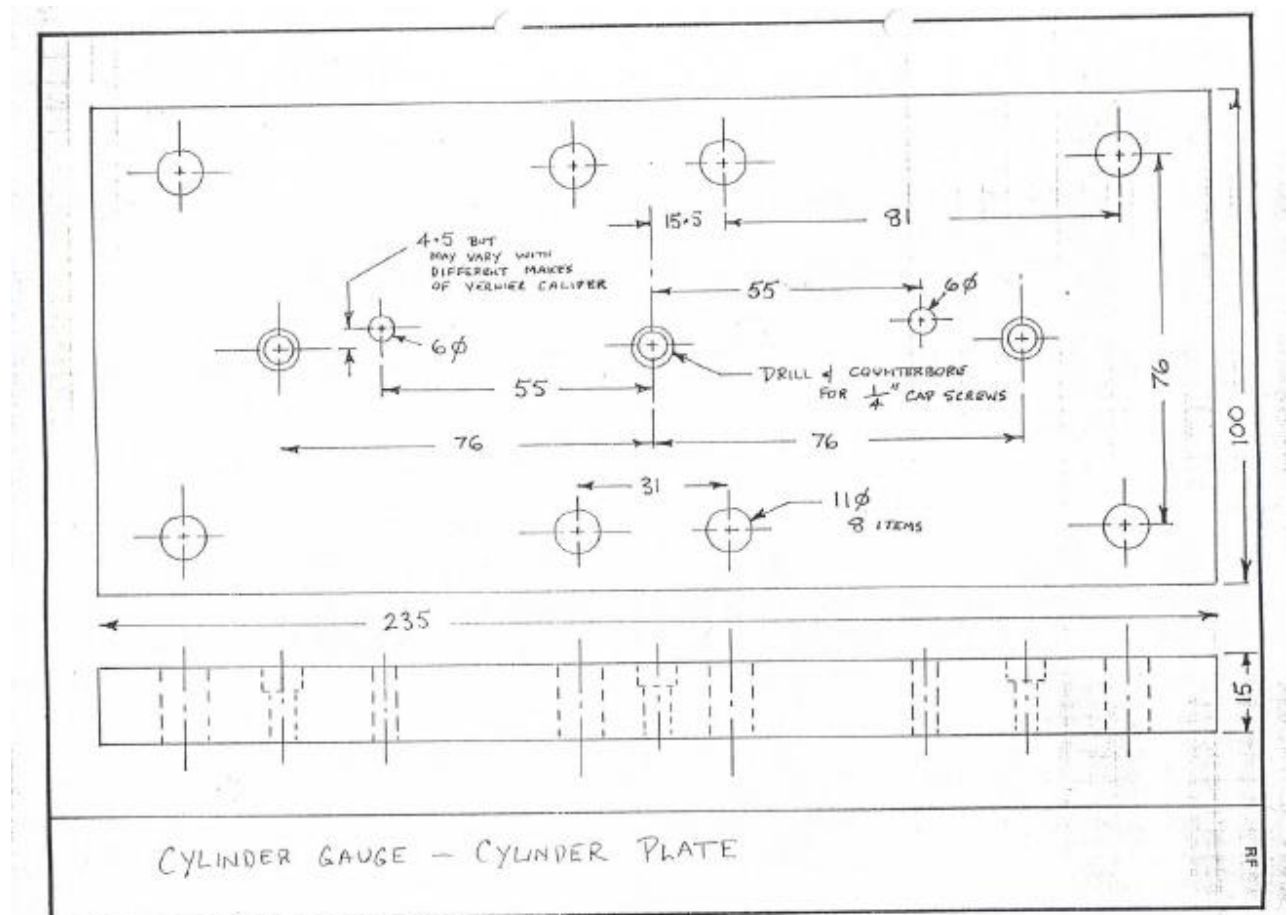
The whole assembly is then fitted across a pair of VW cylinders and clamped down using the cylinder head studs. A Vernier caliper is zeroed, then fitted into the slot between the "top plate" and the "clamp plate" and lowered until the lower face of the caliper abuts the gauge "cylinder plate", then clamped into position.

Step1. The engine is rotated to bring the piston to TDC and the distance to the top of the piston measured with the Vernier caliper. The deck height is the measured distance less the reference thickness of the "cylinder plate".

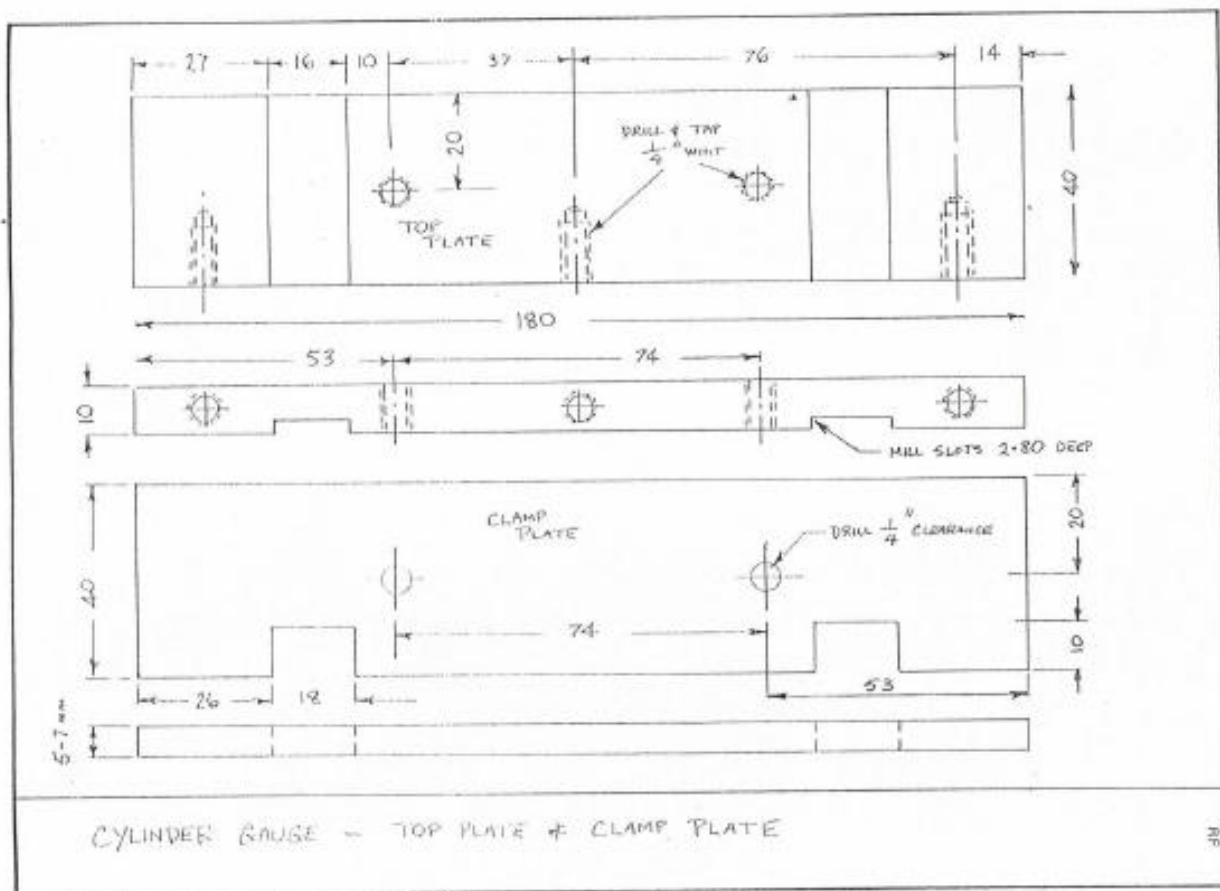
Step 2. The engine is then rotated to BDC and the Vernier caliper is used to measure the distance to the top of the piston. The engine stroke is the measured distance less the distance measured in Step 1.

Steps 3 & 4. Without moving the gauge fitting, the Vernier caliper is moved to the second slot in the "top plate" and Steps 1 & 2 repeated to measure deck height and the stroke of the second cylinder on that bank.

Details: See attached diagrams.









## **Appendix D: Accepted VW Australia Standards Specifications List**

Last updated: - 7/10/2020

Items in alphabetical order

**Cam Gear** - std. tooth count of 25/50

**Conn Rod** – Maximum Nominal Length. 1600cc=137mm, 1200cc=130mm. Measured centre to centre.

**H Beam** - dimension

H beam tube - mild steel tube (CS1020 or similar) with wall thickness 3.3mm +/- 0.3mm

Centre distant of tubes; 1200cc – 120mm, 1600cc - 150mm

Length of both tubes for both 1200cc & 1600cc; Nominal 866mm, diameter of tubes ( $51 \pm 1$ mm).

Centre mounting brackets any material (eg 40x40 RHS) welded in at 290mm centres.

There must be a 20.5mm restrictor in the tube containing the sway bar; the hole may be elongated to accommodate the square ends of the sway bar.