

KART

TECHNICAL

INSPECTION

GUIDE

(Rev. 13)

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PART (A) KART SCRUTINEERING

1. INTRODUCTION

The purpose of scrutineering is to ensure that the kart, the driver's apparel and the driver comply with the requirements of the competition regulations of that event.

However, there are other duties of a scrutineer and these are all summarized below:

1. Filling out and checking relevant documents
2. Checking out the kart, driver's apparel and the driver
3. Carry out various checks during the race day as directed by the stewards and officials on the day

This part is directed towards the general kart requirements (covered under Chapter 25 Australian Kart Formula) and does not include any engine or related components which are covered under **Part (B), Engine Inspection**

Whilst also including procedural matters, it is considered that a major part of Scrutineering is to focus on SAFETY. Whilst sprint karting is a relatively slow speed form of motorsport, accidents do occur for a variety of reasons. It is a tribute to the overall regulations that have been developed over the many years of karting that the number and severity of reported accidents is very low in relationship to the number of karters.

Safety is the responsibility of everyone involved in karting, the drivers, the officials, the mechanics and the organizers. The scrutineer is not primarily responsible for safety, but represents a part of the overall process to maintain safety. If the scrutineer works to the rules of the appropriate chapters, then he/she can be deemed to have performed their duties. If a kart loses a wheel during a race and someone is injured as a result, the responsibility for that falls upon the driver. The scrutineer, whilst having the power to refuse a kart to be raced based on its state at the time of scrutineering, cannot be held responsible for any subsequent failure. The scrutineering function just provides an additional check over the kart in addition to that of the driver's preparation.

While there is a trend towards self-scrutineering, it is advised that scrutineering by a scrutineer is performed at club days. This is because virtually every new karter starts their karting career at club days and they do need as much guidance as possible. The scrutineer can be of great assistance in these situations.

The purpose of this guide is to provide some additional information, guidance and psychology to the scrutineer that is not included in the necessarily concise Karting Manual.

2.0 ATTITUDE

On raceday, the scrutineer is the first or second official the karter will deal with on the day and vice versa. The karters will be hyped up (whether they are aware of it or not) and can tend to be overreactive if challenged on any issue, be it large or small. It is very IMPORTANT to be aware of this right from the start. The same can most likely be said of yourself. You have an important job and don't want to see anything go wrong.

Therefore at all time try to be cheerful, fair, helpful and constructive. This may be difficult at times, the guy you are scrutineering may have run you off the track last meeting. Any such feelings must be ignored. You are a scrutineer, not an historian with a grudge.

Remember also that there will always be new faces in karting and these people need to be treated with some consideration. A rude or ignorant official, perhaps combined with a disappointing day of racing, can be enough to turn people away from our sport in a very short time. It is in our interest to be helpful to the newcomers. Not to compromise the job, but to be helpful.

Your attitude can make or break the pleasure of the day for the karters and yourself, the scrutineer. For 99.9% of people all the above will come naturally, but it is important to have all this in mind at all times.

3.0 FURTHER DETAILS OF EACH TASK

The following is intended to provide some further details into the tasks of the scrutineering;

3.1 Filling out and checking relevant documents.

In the main, this will consist of the Scrutineering Report form and the driver's licence. The Scrutineering Report must be completely filled out and signed by the driver or parent/guardian. This acknowledges they take responsibility for the safety of the kart. For Open events etc where drivers most likely will have 2 engines, these must have their engine numbers recorded in the Scrutineering Report. For the licence, things to check are that the photo matches the driver and the signature is the same in the Scrutineering Report. If the driver is a Provisional, ensure that they have the correct P plate displayed. Ensure that the driver is of the necessary grade for the class he/she is entered for. There will be no issue with Clubman, Formula Australia, Formula Rotax 125 and National classes where the C grade of licence applies, but for the AW Open Class etc, a B licence is required. However pay particular attention to the Midget and Rookie grades with respect to what they have entered for. Review the comments in the licence of any notes re the kart from the previous scrutineering. If there are any, be particularly scrupulous in the inspection of these points. If the same problem exists, then the kart must be deemed unsuitable for racing. Refer to Chapter 13 for further details.

For Open events where the engines are to be sealed, ensure that there is a cylindrical nut with an internal hex (as per Rule 19.33.9.2) for Clubman and ARC air cooled engines.

3.2 Checking out the kart, driver's apparel and the driver

The extent of this will vary, mainly based on the level of competition. Why, might you ask, should this vary? In a high level of competition such as FMK or the National Sprint championships, the karters are usually very experienced, backed with professional teams and are there to win. This means that they and their karts are extremely well prepared and the classic scrutineering procedure superfluous. However, at the other end of the spectrum, the club day, there will be newcomers and karters who only race occasionally. Without detracting from the majority, there are some that put a low priority on to kart preparation and these need to be monitored. For this reason, this part has been written around the club day level.

In most cases, the karts will be very well presented and scrutineering is very simple. However there will occasionally be a "dog" of a kart where it will be dirty, rusty and clearly not prepared. Here you need to be careful, both in your tact to the driver, but also in your inspection. If it is so dirty that you feel that you cannot inspect it, then request the competitor to go and clean it and bring it back. You're in charge.

General things to look at (in the order of the Scrutineering Report) are as follows. Fundamental to this is that the kart must be treated as being "ready to race". No concessions should be made to drivers who say that "they just have to do this or that" to the kart prior to going onto the track. If it's wrong then put it in their licence. (Note refer to the relevant clause in Chapter 23 & 25 for details):

- **Kart Numbers.** These must be easily read with four number plates being required. If not correct in your opinion, note in the licence that these to be remedied by next meeting.
- **Kart Pins.** These are covers steering and deserves some time as this is a key safety area. Main areas to look for are binding of the steering mechanism on either full lock position, lock nuts are tight and a steering shaft retaining device is in place. Some slop in the rod ends, is

acceptable from a safety viewpoint as long as there is no possible way the joint can come apart. Whilst should be highlighted to the driver, the main downside will be a kart that does not handle as well, to the driver's detriment.

- **Nuts on Stub Axles.** As these are continually being removed, the tightness of the Nyloc nut gradually diminishes. If you can turn the nut by hand then it must be treated as failed. However, most usually the nylon end of the nut can be given a sharp hit with a hammer and this will be sufficient to squeeze in the nylon enough so it becomes sufficiently tight.
- **Steering Wheel and Shaft.** General check for cracks. If the steering wheel wobbles on rotation, this would most likely be the result of an accident. As the hub is generally cast, look for cracks in this area. Any crack to be treated as a failure.
- **Floor Pan for cracks.** Main areas to look for are around the tank and the mounting points. Small cracks are common and probably do not represent a safety hazard and can sometimes be overcome with a large washer underneath. However, larger cracks which could result in the floor pan dragging on the ground must be regarded as failures.
- **Throttle Return Springs.** There must be an effective spring at the throttle pedal in conjunction with the spring on the throttle spindle. It is desirable that the pedal snaps back to a closed position on release. If there is any indication of a slow, dragging return (usually by a frayed cable) then either note this in the licence or fail the kart.
- **Tyres and Wheel Rims.** Tyres must be appropriate to the class and be in good condition. The dimples must all be visible. Front wheel must spin freely and with a minimum of wobble. Inspect any runout at the rim flanges for cracks. All cracks to be treated as failures. Back wheels must be tight. If not, note in the licence. You might get the excuse that "they are loose so I can slip them in to fit them in the trailer". Ignore this. If they don't remember to tighten them for scrutineering, then why should they remember to tighten them for practice or racing.
- **Fuel Tank.** This to be obviously leak free in all areas, particularly the cap and hose outlets. Must be firmly located.
- **Fuel Hoses.** These again to be obviously leak-free at all connections points and must have a clip on the outside of the hose at each connection point. Must be sufficiently secured so that there is no possibility of the hose, or even filter, slipping below the underside of the frame and dragging on the ground. Pulse lines do not need to be clipped.
- **Frame for Cracks.** Main areas to look for are around the engine mounts, rear axle supports, engine side pod support. If the kart is so grimy that you consider that you could not see a crack, then request the driver returns the kart after cleaning.
- **Chain & Sprocket Finger Guards.** Must be present and secure. Note all clutches must have a retaining device.
- **Muffler Springs & Safety Cable.** Mufflers must be firmly and securely mounted. The secondary securing system must connect to some secure part of the kart, other than the muffler cradle.
- **Weights securely attached.** Each weight needs to be felt by hand to test for correct clamping. Any looseness must be rectified, as a loose weight will quickly wear a larger hole in itself or the fibreglass seat. It would be undesirable to run into a lead weight when racing.
- **Side Pods.** Must be sufficiently secured and must not protrude beyond the width of rear tyres during dry conditions. If they appear to be really floppy mounted, check that they are greater than 25 mm from ground.
- **Brake Pad Retainers.** Ensure that the screws retaining the pads are lock wired or other designed pad retaining devices are in place and functioning.
- **Brake Cables, Hoses & Fittings.** Ensure that these are in good condition and show no signs of fraying or leaks. Particular areas for fraying are around the pedal and anywhere the cable is bent. The hose must be secured so there is no possibility of slipping below the underside of the frame. Feel the brake effectiveness by holding the pedal and trying to turn the back wheel. Request that the brakes be adjusted if there is an excessive amount of pedal travel. Floating discs do wear so check for excessive wear or slop in these areas.
- **Drivers Apparel.** Suit must be in good condition with no holes. Likewise with gloves and footwear. Helmet must have no signs of accident damage or deep scratches. Night races require a clear visor. Footwear must cover ankles.

3.3 Carry out various checks during the race day as directed by the stewards and officials on the day.

Whilst you have checked the kart during formal scrutineering before practice, there is an ongoing requirement to further check that the kart conforms to the rules during the raceday. Any such secondary scrutineering would be done at the direction of the Stewards or Officials of the day and in the case of larger events, be agreed upon prior to the running of the event as part of the overall planning. This could range from checking for obvious hazards, tyre checking, engine number checking. Fuel testing would be carried out by the Engine Measurers or other designated officer.

4.0 CONCLUSION.

Scrutineering is an essential part of karting control. It can be as enjoyable or as miserable as you want it to be. It also offers a good education and insight into understanding good kart preparation and will help you as a competitor in this regard.

Remember that you have the power to reject a kart from racing as it has been presented.

Remember also that good commonsense and judgment are required.

When in doubt always refer to the rulebook and/or someone who has a lot of experience in these areas.

The goal is for everyone to get out there and have an enjoyable day racing under safe conditions. If you consider that there is a minor fault, then write it in the licence and tell the driver to rectify it for next meeting. If you feel that it is unsafe for the day, request the driver takes the kart away and rectifies the fault and returns it for further scrutineering.

It is recommended that, if you haven't done official scrutineering before, that you go home and practice with your own kart until you are confident with the overall sequence of checking. You don't want to be learning this under pressure from anxious karters.

After successful scrutineering, you retain the signed (by the driver and yourself) Scrutineering Report and return the dated, filled out & signed licence to the driver. The filled out Scrutineering Report are to be handed to the Secretary on a regular basis to ensure that these can be cross referenced to the entry forms.

PART (B) TECHNICAL INSPECTION

1. INTRODUCTION

The purpose of engine inspection is to check the engine and its accessories for compliance to the rules. The extent of the measurement is up to the organizing club and the stewards.

You are not there to prove people are cheating, you are to there to prove that engines conform.

Regular engine inspection is essential to show the karter that the clubs do care about conformance to rules and that any one breaking the rules will be detected. This is particularly so in the control classes where the rules are extensive.

2. CONFIDENTIALITY AND ETHICS

The engine measurer plays an important role of the control of karting. Everyone wants to go faster and, to a large degree, the power of the engine is limited by the rules. Whilst the rules are extensive, people will always be trying to make the engines faster. Some people succeed in this and do so within the rules. The success of this is usually the product of a lot of hard work, thought and time. It would be only fair that the details of how a particular engine is built remain confidential.

Therefore there is an ethical obligation that the engine measurer does not disclose any such details to any third party.

As with any other official duty, the engine measurer must be objective in his/her job and must not let personalities, previous clashes, rumours etc have any effect on the decision making process.

3. PROCEDURE

This can vary somewhat, depending on the size of the meeting which could range from a simple club day to the national titles event. Generally on a smaller day, the stewards will decide on the classes to be inspected and perhaps the extent of measurement.

Factors in the selection of classes to measure:

- If there is perception that someone is going particularly/unusually well.
- Random
- Class size
- Closeness of points in class
- Etc

Once the decision has been made, the technical inspectors should be made aware of these classes. Note that on the day, the actual classes to be measured is to be kept secret from the competitors for obvious reasons

An important consideration in engine measuring is that you are handling another person's property, so it cannot be emphasized too much that you should be careful and respectful of this. Key to this is not getting any engine parts mixed up so it is recommended that the technical inspector(s) develop a prior plan on the actual process and control of stripping a quantity of engines. It is important that you can do this in a quiet, fuss free and well lit environment without any immediate pressure being imposed on yourself. If at any time feel you are being pressured, request that all people, other than any other technical inspectors, in the measuring room to leave, shut the door and be comfortable and at ease to do your job. You are there to do an important job.

The following is the general sequence to be observed by the technical inspector:

1. After the weigh in of the classes to be measured, each kart should have its engine tagged with the kart number, class and finishing order. This is the steward's responsibility.
2. After tagging, the karts must enter the impound area directly from the weigh in. Once in the impound area, the kart must not be touched by any person other than the engine measurer, the exception being the driver or representative when they will be later be requested to remove (or partially strip) the engine from kart. The removal of the engine can only be undertaken when technical inspector gives permission.
3. Prior to the removal of the engine from the kart, there are a number of external checks that can be carried out on the kart. These measurements are to be done by the technical inspector. Note, that extent of these will be determined again by the Clerk of Course and the Stewards in conjunction with the technical inspector. The parts that can be checked externally are:
 - Sealing nuts and tags intact
 - Piston Travel using PTG gauge. (Note this a new test, replacing the previous gauges. It is important that the technical inspector understands the procedure used as per Chapter 26).
 - Spark plug thread depth
 - Air box and adapter
 - Carburettor inc size measurement of this and insulating spacer and also inlet tract length
 - Ignition module

- Muffler, header and silencer
 - Exhaust restrictor for Rookie and Midget classes
 - Fuel sample
4. After these measurements have been completed, the engine measurer can request the driver or representative to remove the engine from the kart and then remove the kart (and other parts that have been measured) from the impound area. After removal from the kart, the tagged engine is to be placed in the engine measurement room.
 5. The next measurement on the engine is the cylinder head cc check. To perform this measurement, the engine must be cool. It is quite possible that the engines will still be warm from the previous race. If this is the case, wait until the engines are cool. Place them in a breezy area, or if a fan is available use this. When cool, perform the test. If an engine fails (ie the fluid overflows the gauge) then it will be necessary to redo the test. To make a retest, the initial volume of test fluid must be completely removed from the engine. This is done by draining (with the engine upside down) and flushing with petrol followed by a rigorous blow out with compressed air. Should it fail, then the competitor should be written up using the Technical Inspectors (or Engine Measurers) Report. See note below on this.
 6. If the Piston Travel Test was not done on the chassis, then this is the time to do this.
 7. After this, the cylinder head is removed and can be checked for protrusion beyond the sealing face and visual concentricity of the spark plug relative to the combustion chamber.
 8. The cylinder can now be removed and the ports and passages visually checked. The emphasis in this area will be the top of the transfer port(s) in the actual cast iron liner. In simple terms, it can be stated that the higher the top of the transfer ports (relative to the exhaust port top) the better. In the case of the Yamaha engines, the liner and its ports are cast, so the thing to look for is a different surface texture in this area compared to other port edges. Spark eroding and acid etching leave a finer surface compared to the as-cast surface. ARC and Leopard cylinders with their machined ports are unlikely to be modified as any changes to the machined surface can be readily observed.
 9. Measure piston (or where stated bore) size to see if it is below the maximum allowed
 10. With the cylinder removed the crankcase width can be measured.
 11. The next stage is to disassemble the crankcases. During this stage, the ignition rotor can be measured and the crankshaft can also be measured.

The above is typical of the inspection that may take place at a National or State Championship event. Clearly this is well in excess that could be expected at a club day event. This could be down to a CC test for one class only over the whole day. What can be done is a function of the club's attitude and the availability of willing and capable people to conduct the testing. Anything is better than nothing.

It is to be noted that you don't have to limit engine measuring to first, second and third. Other scenarios might be to measure every second engine, or third engine in the total class or an unusually fast kart as observed by the stewards. The element here being surprise and presence.

4. WHAT TO DO IF AN ENGINE FAILS? If an engine fails, the first thing to do is to recheck your measurement. Reread the rulebook. Have another engine measurer also check it or watch as you do it. It is important that you are confident on your finding and hence decision. If you are not sure and have no alternative way of checking or inspecting, then the competitor must be given the benefit of the doubt. Assuming you have gone through this, and the engine does not conform, what is the next course of action?

- The first step is to fill out the Technical Inspectors (or Engine Measurers) Report and then call for a steward. When filling out the report, the section Report on Findings must be completed with the minimum of wording. For example, if an engine failed the CC test, just write "Failed Rule 26.01".
- Explain the non-conformance to the steward who will then arrange to have the driver or representative to come over to the engine measuring room.
- The area of failure will be explained and shown to the driver or representative. In the case of a CC test, the competitor has the right to witness a repeat of the test.

- Should the competitor accept the decision, then the engine or part must be withheld by the engine inspector for a period of half an hour. This is the time limit for an appeal.
- Should the competitor take the engine within the appeal period, any rights to the appeal will be denied.
- If there is no appeal the engine can be returned to the competitor or representative, after the steward has given the approval to do this. The stewards will then apply the penalty.
- Should the driver or representative appeal, then the engine or parts be bagged up and sealed and tagged and the bag be given to the clerk of Course for the subsequent tribunal hearing.

5. CONCLUSION.

Engine inspection is a fairly basic procedure and is well guided by specific measurements that the engine must conform to. There is a range of gauges to assist in the checking of measurements.

The key to successful engine inspection is to:

- be careful, rechecking if there is any doubt,
- consult with other technical inspectors and stewards
- be strong enough to not be bullied by drivers and their representatives
- be prepared to close the engine measuring room to allow you to quietly do your job
- be confident in your ability and interpretation of the rules
- practice first on you own engine (even many times over) to become familiar with the gauges. You don't want to do it for the first time under pressure in the engine measuring room with karters breathing down your neck.