

Indoor



Est. 1922

**BRITISH MODEL FLYING ASSOCIATION
THE R/C ACHIEVEMENT SCHEME**

**TEST STANDARDS for CHIEF EXAMINERS
and CLUB EXAMINERS
GUIDANCE for TEST CANDIDATES**

**INDOOR AEROBATICS
(A & B)**

2023 ISSUE
(Mar 2023)

Achievement Scheme Information & Communication

The BMFA Achievement Scheme provides every RC flyer the opportunity to set themselves an achievement target to aim for, and then have their progress assessed and confirmed by an examiner.

It is important that All those involved in training, examining and preparing for the tests, are well informed and up to date with all that the scheme has to offer. To this end, and to aid communication, important information regarding scheme developments, as well as details of all of the tests and their associated guidance documents, are made available to everyone via a number of sources, which include:-

- The Achievement Scheme website - <http://achievements.bmfa.org/>
- The BMFA website - <http://bmfa.org>
- The BMFA News
- The Achievement Scheme closed Facebook group

It's important to appreciate that **ALL** of the scheme documents are reviewed and updated on an annual basis. Whichever document you are using, you will know if you have the right one, simply by looking at the date on the front cover. If it's not dated with the current year, it's the wrong one!

Most BMFA Clubs have Club Instructors/Examiners who will be familiar with the scheme and what is expected of anyone thinking of participating. If your club does not have a club examiner then each BMFA Area has an Achievement Scheme Coordinator (contact details can usually be found on the BMFA Area website) who can usually help in coordinating tests, or answering queries about tests etc. All BMFA Areas have Area Chief Examiners who would normally undertake Club Examiner tests, but are also available to help out with club tests, if requested. Importantly, they are also very knowledgeable about the scheme and its requirements. Area coordinators can often find an ACE that is close to your club, if you are having difficulty arranging for a test.

All BMFA Achievement Scheme & training documents are available to download from the BMFA Achievement Scheme website <http://achievements.bmfa.org/>. You can also register your email address with the Achievement Scheme website and receive email notification of any news flashes, notification of scheme events and updates to documentation etc. as soon as they are published.

The Achievement Scheme also has a closed Facebook group (you just have to apply to be included) where comment and queries can be posted and examiners/instructors and members of the Achievement Scheme Review Committee can answer questions, or offer clarification.

If you have any query about the scheme or constructive comment on the scheme you can contact the Power/Silent Flight Scheme Controller (RCPAS@bmfa.org), or the Achievement Scheme Review Committee, via the BMFA Office.

General

The Achievement Scheme is run by the BMFA as a National Scheme and it is open to all model flyers. Where a non-member wishes to participate in the achievement scheme the examiner who will be conducting the test must inform the BMFA office via email or telephone no later than the day prior to the test being carried out of the non-member's full name, address and the date that the test will be conducted. This enables the BMFA to extend insurance at suitable levels for the day of the test. If this procedure is not followed the test will be invalid.

The examination for an 'A' Certificate may be taken on application to any BMFA Examiner. The examination for a 'B' certificate may be carried out by:

- (a) Two BMFA Club Examiners.
- (b) A BMFA Chief Examiner

The candidate must successfully complete the test schedules in one attempt. A maximum of two attempts at the examination are permitted in any one day.

The candidate should have studied the BMFA Member's Handbook 2017 (sections 8 through to 24 inclusive, including any amendments), the Achievement Scheme Handbook, and any local site rules (if applicable). Besides being excellent guides to the safe flying of model aircraft, most of the questions asked at the end of the test will be from these sources. Remember that addendum sheets to the Member's Handbook are published in BMFA News and on the BMFA website and that these may also be relevant as they contain up-to-date information.

Also be aware that you may ask questions on any local site rules that the candidate should be aware of and these may form an important part of the test questions you ask.

Legal Responsibilities

Only pilots with a suitable model that are operating legally are eligible to take the test.

There are clearly defined legal requirements for the operation of Small Unmanned Aircraft (model aircraft), from passing a CAA (or BMFA) legal & safety knowledge test before piloting a model, to registering with the CAA as an SUA Operator (can also be done via the BMFA) if the pilot is also the owner and operator of the model aircraft, then ensuring the SUA Operator identity number is appropriately attached to the model. There are also restrictions on where a model can be flown and the heights and distances from people, property, vehicles or structures that the model can be operated. Finally, there is a legal requirement to operate the model safely e.g. ensuring the model is 'fit for safe flight' and the pilot is in a fit state to undertake that flight, as well as the site and weather conditions being suitable.

Models operated indoors are exempt from most of the above operational requirements regarding the CAA registration, numbering, and legal knowledge testing, but it is something you should be aware of. The final point about operating safely is valid wherever you fly.

The 'A' Certificate

The 'A' Certificate is a measure of indoor aerobatic flying ability and safety.

Please note that Basic Proficiency Certificates are not applicable to Indoor flight tests.

The 'B' Certificate

The 'B' Certificate is “designed to recognise the pilot's more advanced ability and safety awareness”.

As an Examiner, therefore, the level of competence required from a candidate should be based on the question; 'has this person demonstrated their flying ability and safety to me in a satisfactory manner”.

The aim of the 'B' certificate is to give the indoor flyer a personal attainment goal beyond the 'A' Certificate; a demonstrated level of competence and safety which is attainable by the average pilot with a little thought and practice.

The Indoor aerobatic 'B' Certificate has been set up as a method of encouraging indoor flyers to gain further flying skills by meeting and being tested to a recognised national standard.

The long term strategy behind this is that if enough indoor flyers qualify for their 'B' certificates then the general standard of flying at indoor events cannot help but rise. Examiners should be pressing this concept positively within their clubs and at indoor events.

A candidate wishing to take the 'B' must already have passed the 'A' in that discipline.

However, where a candidate presents for a B test who does not already hold an 'A' certificate it is acceptable for the candidate to complete the flying portion of the 'A' test successfully and then move immediately to the flying portion of the 'B' test before attempting the test questions.

If the candidate passes the 'A' flying test but fails the 'B', then you should ask the 'A' questions. If the candidate passes both the 'A' and the 'B' flying tests, then you should ask the 'B' questions.

Note that the 'A' flying test does not finish until the model has been retrieved and the post flight checks have been completed.

The Model

The test will need to be performed with an aerobatic model with a minimum of 4 channels.

The use of a gyro or autopilot is not allowed during the test. If any such system is fitted to the model it must be disabled during the test and you should check that this has been done.

Electric Powered Models must be treated as LIVE as soon as the main flight battery is connected, irrespective of radio state and great care must be demonstrated by the candidate. The arming sequence should be clearly understood and discussed/demonstrated to you by the candidate.

Whatever model is brought by the candidate, it must be suitable to fly the manoeuvres required by the test they are taking. You do not have the authority to alter the required manoeuvres to suit a model and if, in your opinion, the model is unsuitable for the test then you should explain this to the candidate and tell them that they cannot use that model. The selection of the model to do the test is the responsibility of the pilot and it is their ability that is being tested, not the model.

Buddy Box Leads

Buddy leads and other dual control training aids must not be used during any achievement scheme tests.

Hand Launching

A hand launch is allowed if the model is not capable of a rolling take off.

Height, Speed and Size of Manoeuvres

The 'A' certificate candidate should be a reasonably confident pilot, even though they may only have been flying for a few months. The 'B' certificate candidate should be a confident pilot and this should be shown in the speed at which they fly the test and the use of the available space.

The size of the manoeuvres will be dependent on the space available for the flight, however the manoeuvres should be flown to make the best possible use of the space available. It is not acceptable for the model to touch the walls, ceiling, floor (except for take off and landing) or any other obstacles during any manoeuvre. If this occurs in the 'A' test the examiner may ask for the manoeuvre to be repeated. If this occurs in the 'B' test the examiner should ask himself if the candidate has practised the required manoeuvres enough.

The test has elements flown at both a low and a high level and elements that transition between low and high levels, those flown at low level should be flown at no more than a 1/4 of the available height from the ground (standard low level height), those flown at high level should be flown at no less than 3/4 of the available height from the ground (standard high level height). Manoeuvres that transition between the two levels should also use these 2 benchmarks for height.

Intelligent use of the throttle is an important factor in confident flying and you should watch out for this. A pilot who flies at take-off power throughout the whole flight should not pass; they are not thinking.

Consistency

The combination of appropriate heights and good use of the throttle should mean that, although the model will be flying at various heights throughout the test, these heights will be flown in a steady and consistent manner and you should note if the height flown varies significantly when it doesn't need to.

It is a requirement that "all manoeuvres are carried out in front of the pilot" with the implication that the model will be crossing in front of the pilot just beyond the take-off and landing area on several occasions during the flight. Care should be taken by the pilot that the line of approach each time is consistent and you should take particular note if it is not.

Slightly varying height control and somewhat inconsistent lines are not necessarily reasons to fail the 'A' test candidate but they do give you a good indication of the pilot's general level of competence and could influence your final decision. Unnecessary varying of height, inconsistent lines and touching the walls, ceiling, floor (except for take off and landing) or any other obstacles are valid reasons to fail a 'B' test candidate as they give a good indication of the flyer's general level of competence and they should strongly influence your final decision.

Poorly flown height or lines are a sure sign that the flyer has either not practised the test or has not reached the required standard of flying and are legitimate reasons to fail them.

Continuity

Although the manoeuvres are set out in such a way that they can be flown one after the other as a schedule, this is ABSOLUTELY NOT what is required. The candidate may opt to fly the test in this way, but it is not mandatory. However, the manoeuvres must be flown in the order specified for the test i.e. (a), (b), (c) etc. – see individual test checklist. Most flights will have a combination of direct transitions and positioning circuits between manoeuvres and it will help if you discuss this with the candidate before the flight. You, of course, should be watching any extra circuits just as carefully as the rest of the flight as they can tell you a lot about the competence of the flyer.

A pilot who transitions directly from one manoeuvre to the next is attempting to fly to a higher standard than required. This is quite acceptable if they are competent but you should watch out for the pilot who hasn't practised enough. Trying to fly the test in this way can get the candidate into some very awkward positions.

The 'B' certificate allows an intermediate landing. The intermediate landing must be at a predetermined point in the flight and only for the sole purpose of the fitting of a freshly charged battery. This landing may only be made with the prior consent of the Examiners. Two attempts per examination will be allowed in any one day.

You should be aware of the possibility of such an intermediate landing but under no circumstances must you allow an unscheduled landing to be passed under the rule. It must be applied exactly as written and any landing must take place at the point in the schedule agreed prior to the flight.

Trim

It is expected that the candidate will start the test with a model that has been trimmed out previously but they should be able to trim the model out in the air very quickly if necessary. If you see obvious signs that the model is out of trim and the candidate makes no attempt to rectify the matter you should seriously question their basic competence.

On the other hand, if they do need to re-trim and are making attempts to do so, you should make allowances for a short time of flight with a somewhat erratic flight path. This should not be penalised unless it puts the model in any danger or unless the model flies behind the pilot or in any other unsafe area.

Nerves

Quiet competence is what you should be looking for during the flight but most candidates will be nervous and you should make some allowance for this. If the flyer is very nervous, serious consideration should be given to abandoning the test for the time being and offering the candidate a coaching flight or two to settle them down before re-taking the test. This can be done on the same day and can really help those candidates who have trouble with nerves when flying in a test situation.

Repeating Manoeuvres

At 'A' certificate level the manoeuvres are reasonably simple and the candidate should be competent to fly them with very few errors. At 'B' certificate level the candidate should be competent to fly the test with very few errors. If you see any major faults the test should be taken again. It may be, however, that the candidate will make a **minor** mistake on a manoeuvre and if you are not fully satisfied with what you have seen you should consider asking for the manoeuvre to be repeated.

Some judgement is called for on your part here. A major mistake is grounds for failing the candidate, especially if loss of control has occurred or a dangerous situation has arisen. You should definitely **not** let them have multiple attempts at each manoeuvre until they get it right but you must give yourself the best chance of assessing the competence of the pilot you are testing.

You should consider what you have seen the model do and if you think to yourself "could be better" then a request that the manoeuvre be repeated may be considered. Be extremely careful about using this option, however, as you could be degrading the worth of the test. It must not under any circumstances degenerate into a series of 'practice' manoeuvres.

Repeating the Test

The rules allow two attempts at the test in a day. If the candidate fails the first of these you must consider their performance in deciding what to do next. Many failures will be reasonably good pilots or they could be borderline cases. In these circumstances it might be appropriate to offer one or two coaching flights and then a repeat of the test. Remember that many of the candidates will be unfamiliar with flying under pressure and might do very well on the second test.

On the other hand, it will probably be obvious to you on many occasions that the pilot being tested is simply not ready for the test they are taking. In this situation it is better to tell them

so quite clearly. It could then be extremely useful for you to offer to fly a demonstration test for the candidate (assuming that a suitable model is available to you and that you are happy to do so) so that the candidate can gain an idea of the standard of flying required, especially if they have shown a lack of understanding of the manoeuvres and positioning. This, possibly along with a little coaching, is far more useful to everyone than simply telling the candidate that they have failed.

Helpers for Disabled Candidates and Others Who have Requested Help During the Test

When disabled or young candidates present themselves for the test it may be that they will not physically be able to perform all the actions that most candidates can. At times, other candidates may also request help with certain physical aspects during the test (they may, for instance, have an injured finger). There will be times when you, as an Examiner, will think „how much can I relax the test requirements for this person“.

Some Examiners make the decision to make no allowances at all but this effectively bars many people from attempting the tests. If we think of the achievement scheme as a true national scheme then we must consider how we can accommodate candidates, not how we can stop them from participating.

The answer, of course, is that you, as an Examiner, must make on-the-spot decisions about what you will allow during the test and, in such cases, you are within your authority to take such decisions. The guidelines set out below may help but at all times the two items at the end of this section must take precedence. They are not negotiable and mean that, whoever the candidate is, they have to convince you that they know what they are doing or what is happening for the full duration of the test.

For instance, a disabled flyer may have difficulty handling the model and may not be able to carry it out to the flying area, release it for launch or retrieve it after the flight. The sensible use of a helper is certainly allowable in such cases but it is essential that they only do what the candidate asks them to do. Pre-flight checks and battery connection may be another problem area that can be overcome by a helper but you should expect the candidate to do as much of the work as possible themselves and they should be able to talk you through anything that the helper does for them. Be sure to discuss all this with the candidate before starting the test.

In all cases:

(1) If, at any time, the helper takes over the decision making process from the candidate then the candidate must fail.

(2) You can make no allowances whatsoever for anyone during the flying of the test. The candidate can either perform the flight manoeuvres as specified or they can't. If they can't then they must not be passed.

Make sure in your briefing that both the candidate and the helper are fully aware of both of these points.

The 'A' Test

(a) Carry out pre-flight checks as required by the BMFA safety codes and demonstrate an understanding of 'SWEETS'.

The candidate must demonstrate their understanding of risk assessing a site for flying by talking through SWEETS as described in the Member's Handbook. A candidate must be expected to be able to demonstrate how they have come to the decision it is safe to fly at the location, which must still be applied even if the site is an established flying site.

The candidate must demonstrate the model's failsafe, which as a minimum should be set as 'throttle to idle' upon loss of control signal. The candidate must ensure this is done safely following the guidance in the Member's Handbook. A candidate must be failed immediately if the candidate does not make the model 'safe' by means of either a suitable restraint or removing components that might spin uncontrollably such as propellers or blades.

If the failsafe does not work when tested for any reason, then the test must be considered a failure.

The pre-flight checks are laid out clearly in the BMFA handbook. Ask the candidate to go through their checks as if the test flight was their first flight of the day. Particular attention should be given to airframe, propeller, control linkages and surfaces.

Points to look for are that the candidate has a steady and regular ground routine, especially when connecting the flight battery. Nerves may play a part in the pits but you should satisfy yourself that the candidate is actually in control of what they are doing when preparing their aircraft for flight.

A neat ground layout makes a good impression but bear in mind that many 'A' certificate candidates will not have been flying for too long and you should be prepared to make allowances. A poor performance in this area is not grounds for failing the candidate, however, but it is inevitable that you will be making mental notes of all aspects of the candidate's competence and this is one that might have an effect on a real 'borderline' case.

Pay particular attention to the way the candidate uses the local frequency control system and make sure that they fully understand it and use the correct sequence appropriate to their model. For 35 MHz, this is usually 'get the peg, Tx on, Rx on'. For 2.4 GHz, the candidate should be aware of any local transmitter usage limitations and if a flight peg is required, it must be obtained before the Tx is turned on. Some radio equipment and, occasionally, a specific model requirement requires that the Rx be switched on first and, if this is the case, the candidate should explain this clearly to you.

Any candidate who switches their radio on before checking the frequency control system should be failed on the spot.

If there is no one else available then there is nothing to stop you aiding the candidate by holding the model for the power check, carrying it out for take-off etc. but any such actions must be performed by you directly on the instructions of the candidate. You must not prompt them or carry out any actions of your own accord. Talk this over with the candidate in your pre-flight briefing.

As the test is being taken with an electric powered model then the candidate should show that they are familiar with the safe handling of such models.

In particular they must demonstrate to you the 'arming' sequence for their model. For safety reasons many speed controllers have a pre-programmed sequence of actions that have to be followed before the motor will respond to throttle stick movements. For instance, after

switching on Tx and Rx and then plugging in the main flight battery, one type of controller requires that you move the throttle stick from low to full throttle and then back to low before the motor is 'armed' and ready for flight.

The candidate must be fully familiar with the system fitted to the model and should brief you on the system and demonstrate it working at some time during the pre-flight checks.

Generally, they must show that they are paying particular attention to the 'transmitter on - receiver on sequence and they must make you aware that they are treating the model as 'live' as soon as the flight battery is plugged in, no matter what arming sequence they may then have to go through.

The pilot must stand in the designated pilot area for the entirety of the flying part of the test.

(b) Take off and complete a left (or right) hand circuit and overfly the take-off area.

The model may be carried out by the candidate or a helper or it may be taxied out from a safe position in front of the pits/pilots area. **Taxiing out of the pits is an instant fail.** Prior to carrying or taxiing out, the pilot should inform other pilots flying that his model is going out onto the active area.

Take off must be done with the model a safe distance from the pits area and on a line which does not take the model towards the pits, other people or any other danger area.

Take off should be reasonably straight with the model not being pulled off the ground too soon. It can be a point in the flyer's favour if, in the case of the take-off going wrong, they abandon it in a safe manner, you should immediately reassure the candidate that they will not be penalised for taking correct actions, even though these may conflict with what the test requires.

Climb out should be at a steady angle and straight until operational height is reached when the throttle should be brought back to cruise power, the model levelled out and the first turn of the circuit started.

The type of circuit is not stated so either racetrack, rectangular or circular is acceptable. This choice of circuit type applies to the rest of the flight as well except when a certain type of circuit is specified for a manoeuvre.

On completion of the circuit, the model will be flying past the front of the pilot at a safe distance out. Tell the candidate prior to the flight the line that you want them to be following.

You must make sure that the candidate is clear on this, the line will be set by the model flying across in front of them on a heading which should be agreed before the flight and passing over a set point.

(c) Fly one low level left hand circuit with a transition to one high level left hand circuit.

The type of circuit is not stated so either racetrack, rectangular or circular is acceptable. The manoeuvre starts as the model passes in front of the pilot and the low level circuit should be flown at a reasonably constant height of no more than 1/4 of the available height from the ground, the transition from low level to high level should take place as the model approaches and passes the pilot towards the end of the low level circuit and start of the high level circuit, the transition should be at a reasonably constant rate of climb but should not be approaching

vertical. The high level circuit should be flown at no less than 3/4 of the available height from the ground.

(d) Fly one high level right hand circuit with a transition to one low level right hand circuit.

The type of circuit is not stated so either racetrack, rectangular or circular is acceptable. The manoeuvre starts as the model passes in front of the pilot and the high level circuit should be flown at a reasonably constant height of no less than 3/4 of the available height from the ground, the transition from high level to low level should take place as the model approaches and passes the pilot towards the end of the high level circuit and start of the low level circuit, the transition should be at a reasonably constant rate of descent but should not be approaching vertical. The low level circuit should be flown at no more than 1/4 of the available height from the ground.

(e) Fly a "figure of eight" course with the cross-over in front of the pilot, height to be constant and below 3 metres.

The candidate should aim to fly the manoeuvre as shown in the diagrams for the outdoor FW A in the handbook, however a manoeuvre which is "stretched" will be acceptable **BUT** the crossover point must always be in front of the pilot. This means that after the standard line and height run in, the model need not necessarily be turned through ninety degrees in the first turn so that it is flying exactly away from the pilot.

The manoeuvre finishes, as in the diagrams, with the model flying across the front of the pilot at standard line and height, not with another turn away.

(f) Fly one inside loop.

Run in height and line in should be at the standard low level height and the manoeuvre should be performed exactly in front of the pilot. A perfect loop is not required but the exit height and line should be very close to the original. The size of the loop will be dependent on the available height with the top of the loop at the standard high level height.

Skewing out is a sign that the model has not been trimmed correctly or that the wings were not level at the start of the manoeuvre. The pilot should not get into this situation to start with but if they do then they must be able to compensate; if they cannot then you have to draw your own conclusions. Watch that the throttle is used during the manoeuvre and penalise the pilot if they fly the manoeuvre at a constant high throttle setting.

(g) Fly one outside loop downwards from the top i.e. a bunt.

Run in height and line in should be at the standard high level height and the manoeuvre should be performed exactly in front of the pilot. A perfect loop is not required but the exit height and line should be very close to the original. The size of the loop will be dependent on the available height with the bottom of the loop at the standard low level height.

(h) Fly one double stall turn

The model should be flown at the standard low level height past the pilot from left to right the first stall turn should be performed towards the right hand end of the hall at the standard high level height, after the first stall turn is completed the model should return past the pilot at the standard low level height and the second stall turn performed towards the left hand end of the hall. Both stall turns should be away from the flight line.

(i) Fly 1 circuit with 1 full roll on opposite sides of the circuit.

Manoeuvre should be flown at the midpoint between the low and high level standard heights. The circuit can be either square or rectangular and the rolls can be either in the sides of the circuit or the front and back. The direction of rotation of each roll should be opposite.

(j) Fly a rectangular approach and perform a landing on the designated landing area.

The landing should be within a 5 metre by 5 metre square in front of the pilot.

The candidate should agree with the examiner beforehand whether they intend to take the transmitter with them when retrieving their model or choose to leave it with a competent person. The candidate must explain the safety considerations behind their decision, which must be agreed with the examiner. If the candidate elects not to take the transmitter and no one else is available to hold it then you should offer. Whatever process is agreed, it must also be in accordance with any relevant club rules, as appropriate. Generally, for 2.4GHz operations and with suitable consideration, candidates should be able to give a robust safety based argument for taking their Tx with them to recover the model, if it has landed on the normal landing/take-off area. Conversely, it is difficult to see how any such argument could be made for candidates using 35MHz or 27MHz equipment.

Remember that electric models must be assumed to be 'live 'until the flight battery has been disconnected and the handling of the aircraft by the candidate must reflect this during retrieval and in the pits area.

The 'B' Test

(a) Carry out pre-flight checks as required by the BMFA safety codes and demonstrate an understanding of 'SWEETS'.

The candidate must demonstrate their understanding of risk assessing a site for flying by talking through SWEETS as described in the Member's Handbook. A candidate must be expected to be able to demonstrate how they have come to the decision it is safe to fly at the location, which must still be applied even if the site is an established flying site.

The candidate must demonstrate the model's failsafe, which as a minimum should be set as 'throttle to idle' upon loss of control signal. The candidate must ensure this is done safely following the guidance in the Member's Handbook. A candidate must be failed immediately if the candidate does not make the model 'safe' by means of either a suitable restraint or removing components that might spin uncontrollably such as propellers or blades.

If the failsafe does not work when tested for any reason, then the test must be considered a failure.

The pre-flight checks are laid out clearly in the BMFA handbook. Ask the candidate to go through their checks as if the test flight was their first flight of the day. Particular attention should be given to airframe, propeller, control linkages and surfaces.

Points to look for are that the candidate has a steady and regular ground routine, especially when connecting the flight battery. Nerves may play a part in the pits but you should satisfy yourself that the candidate is actually in control of what they are doing when preparing their aircraft for flight.

A neat ground layout makes a good impression and is to be expected from 'B' certificate candidates.

A poor performance in this area is not grounds for failing the candidate, however, but it is inevitable that you will be making mental notes of all aspects of the candidate's competence and this is one that might have an effect on a real "borderline" case.

Any candidate who switches their radio on before checking the frequency control system should be failed on the spot.

If there is no one else available then there is nothing to stop you aiding the candidate by holding the model for the power check, carrying it out for take-off etc. but any such actions must be performed by you directly on the instructions of the candidate. You must not prompt them or carry out any actions of your own accord. Talk this over with the candidate in your pre-flight briefing.

As the test is being taken with an electric powered model then the candidate should show that they are familiar with the safe handling of such models.

In particular they must demonstrate to you the "arming" sequence for their model. For safety reasons many speed controllers have a pre-programmed sequence of actions that have to be followed before the motor will respond to throttle stick movements. For instance, after switching on Tx and Rx and then plugging in the main flight battery, one type of controller

requires that you move the throttle stick from low to full throttle and then back to low before the motor is „armed“ and ready for flight.

The candidate must be fully familiar with the system fitted to the model and should brief you on the system and demonstrate it working at some time during the pre-flight checks. Generally, they must show that they are paying particular attention to the „transmitter on - receiver on sequence and they must make you aware that they are treating the model as „live“ as soon as the flight battery is plugged in, no matter what arming sequence they may then have to go through.

The pilot must stand in the designated pilot area for the entirety of the flying part of the test.

(b) Take off and complete a left (or right) hand circuit and over fly the take-off area.

The model may be carried out by the candidate or a helper or it may be taxied out from a safe position in front of the pits/pilots area. **Taxiing out of the pits is an instant fail.** Prior to carrying or taxiing out, the pilot should inform other pilots flying that his model is going out onto the active area.

Take off must be done with the model a safe distance from the pits area and on a line which does not take the model towards the pits, other people or any other danger area.

Take off should be reasonably straight with the model not being pulled off the ground too soon. It can be a point in the flyer's favour if, in the case of the take-off going wrong, they abandon it in a safe manner, you should immediately reassure the candidate that they will not be penalised for taking correct actions, even though these may conflict with what the test requires.

Climb out should be at a steady angle and straight until operational height is reached when the throttle should be brought back to cruise power, the model levelled out and the first turn of the circuit started.

The type of circuit is not stated so either racetrack, rectangular or circular is acceptable. This choice of circuit type applies to the rest of the flight as well except when a certain type of circuit is specified for a manoeuvre.

On completion of the circuit, the model will be flying past the front of the pilot at a safe distance out. Tell the candidate prior to the flight the line that you want them to be following.

You must make sure that the candidate is clear on this, the line will be set by the model flying across in front of them on a heading which should be agreed before the flight and passing over a set point.

(c) Fly one inverted low level left hand circuit with a transition to one inverted high level left hand circuit.

The type of circuit is not stated so either racetrack, rectangular or circular is acceptable. The manoeuvre starts as the model passes in front of the pilot and the low level circuit should be flown at a reasonably constant height of no more than 1/4 of the available height from the ground, the transition from low level to high level should take place as the model approaches and passes the pilot towards the end of the low level circuit and start of the high level circuit, the transition should be at a reasonably constant rate of climb but should not be approaching vertical. The high level circuit should be flown at no less than 3/4 of the available height from the ground.

(d) Fly one inverted high level right hand circuit with a transition to one inverted low level right hand circuit.

The type of circuit is not stated so either racetrack, rectangular or circular is acceptable. The manoeuvre starts as the model passes in front of the pilot and the high level circuit should be flown at a reasonably constant height of no less than $\frac{3}{4}$ of the available height from the ground, the transition from high level to low level should take place as the model approaches and passes the pilot towards the end of the high level circuit and start of the low level circuit, the transition should be at a reasonably constant rate of descent but should not be approaching vertical. The low level circuit should be flown at no more than $\frac{1}{4}$ of the available height from the ground.

(e) Fly a “Cuban Eight” with half rolls.

From level flight perform an inside $\frac{5}{8}$ loop to inverted 45 degrees down, half roll to upright, perform a $\frac{3}{4}$ inside loop to inverted 45 degrees down, half roll to upright and recover in level flight at the point where the first loop was started.

(f) Perform a 2 turn inverted spin or 2 descending 360 degree inverted tight rudder turns.

The spins/turns should be performed in front of the pilot, from level flight, half roll to inverted perform 2 spins/turns, exit inverted on the same heading as the entry, half roll to upright.

(g) Fly 2 consecutive square loops.

That is, from level flight, pull to vertical pull at each corner through 90 degrees and exit. This should be flown from the standard low level height and line and centred in front of the pilot, returning to standard low level height and line when the manoeuvre is complete.

The square loops should be superimposed on each other with each leg of approximately the same length and each corner of approximately the same radius. Throughout the duration of the manoeuvre, the heading of the model through the horizontal legs and the line through the vertical legs should not deviate substantially although minor deviations are acceptable.

(h) Perform a $\frac{3}{4}$ roll to knife edge flight for minimum 5 metres

From level flight perform a $\frac{3}{4}$ roll away from the flight line to knife edge flight, fly a minimum of 5 metres in knife edge, $\frac{1}{4}$ roll to upright. The knife edge flight should be centred on the pilot. Throughout the duration of the manoeuvre, the heading of the model should not deviate substantially although minor deviations are acceptable.

(i) Perform a 5 second prop hang, climb to maximum height and perform a stall turn. 1/4 roll in climb, 1/4 roll in descent.

From level flight pull to vertical in front of pilot and prop hang for 5 seconds climb to maximum available height with 1/4 turn in climb so the “Canopy” is towards the pilot, perform a stall turn, 1/4 turn in descent and pull to exit. Exit to be on the same heading as entry.

(j) Fly a harrier pass.

From level flight pull to a high angle of attack maintain level forward movement for a minimum of 5 metres push to level flight. Harrier flight should be centred on the pilot. Throughout the duration of the manoeuvre, the heading of the model should not deviate substantially although minor deviations are acceptable.

(k) Perform a rectangular approach and land

The landing should be within a 2 metre by 2 metre square in front of the pilot.

The candidate should agree with the examiner beforehand whether they intend to take the transmitter with them when retrieving their model or choose to leave it with a competent person. The candidate must explain the safety considerations behind their decision, which must be agreed with the examiner. If the candidate elects not to take the transmitter and no one else is available to hold it then you should offer. Whatever process is agreed, it must also be in accordance with any relevant club rules, as appropriate. Generally, for 2.4GHz operations and with suitable consideration, candidates should be able to give a robust safety based argument for taking their Tx with them to recover the model, if it has landed on the normal landing/take-off area. Conversely, it is difficult to see how any such argument could be made for candidates using 35MHz or 27MHz equipment.

Remember that electric models must be assumed to be ‘live ’until the flight battery has been disconnected and the handling of the aircraft by the candidate must reflect this during retrieval and in the pits area.

The Questions

Having successfully completed the safety and flying elements of the test, the candidate must then answer correctly a minimum of five questions on safety matters, based on the BMFA Safety Codes for General Flying and local flying rules etc. for the 'A' certificate and a minimum of eight questions on safety matters, based on the BMFA Safety Codes for General Flying and local flying rules and the 'Safety Code for Model Flying Displays' for the 'B' certificate.

Remember that on **no account** can a good performance on the questions make up for a flying test that you considered a failure. If you have failed the candidate's flying you should not even start to ask the questions. On the other hand the achievement scheme is a test of both flying ability and knowledge. It doesn't matter how well the candidate can fly, if they cannot answer the safety questions they should not pass.

How many questions you should actually ask will depend on the circumstances at the time. For instance, if the candidate has done a good flying test and answers the first five/eight questions with confidence then you need go no further. An acceptable test but with some rough edges can be offset to an extent by the candidate performing well in the first five/eight questions.

A candidate who has done a test which you found only just acceptable and who hesitates on the questions should be asked a few more than eight and if you are not satisfied that they have actually read the safety codes, you should not hesitate to fail them.

There is some debate as to whether a list of 'approved' questions should be published for examiners to use. Current opinion is that if such a list is published then candidates will also be able to study the list and will not need to study the BMFA handbook and this is probably not a good idea.

As an examiner, however, you should prepare yourself thoroughly for any testing that you do and you may wish to sort out your own personal and private list of sensible questions. Don't forget that you can use any local rules which you know and which the candidate should be aware of.

Remember that the majority questions you ask are to be BASED on the BMFA Safety Codes; you are not expected to ask them 'parrot fashion' and the candidate is not expected to answer that way either.

This opens up the possibility of asking a candidate if they can think of reasons behind specific rules. For instance, why is the club frequency control system operated as it is and what might go wrong? why should operating transmitters not be taken out when retrieving models from an active flying area? or why should models not be taxied in or out of the pits area?

Administration

There are specific forms for Examiners to use during the Indoor Aerobic 'A' or 'B' test, and if you do not have one then a call to the BMFA Leicester office will have some in the post to you by return.

Completed forms should be sent to the Leicester office within seven days of the test and, whilst they must be filled in by the Examiner, they may be sent in to the office by either the Examiner or the Candidate. Pass forms can also be submitted online by examiners via the Achievement Scheme website at <https://achievements.bmfa.uk/> under the menu item "The Tests". Passwords for the Achievement Scheme Web site form submission are available to current registered examiners from the BMFA Office. You should take great care that all the details are filled in correctly, especially the successful candidates **NAME** and their **BMFA number** (this can save a great deal of confusion). If the candidate is not a BMFA member then it is especially important that you get their name and address correct and in full.

This is very important as what is seen on the pass form is what will appear on the final certificate. It is embarrassing for you to have to send one back to be re-done and it gives the candidate a definite impression of sloppy work by someone.

Please note that the A4 Certificate(s) and updated membership card are not routinely sent directly to the individual tested. However, the Leicester office will send the documents directly to the individual, upon direct and specific request from the Examiner concerned.

Examiners and Candidates Check List

The following is a short checklist of matters to discuss with the candidate taken from this document. This checklist can be used to ensure that all points raised above have been discussed with the pilot prior to any flights:

1. Has the candidate read: -
BMFA Member's Handbook 2017 (sections 8 through to 24 inclusive)
Achievement Scheme Handbook
Local site rules (if applicable)
2. Discuss whether the model is suitable, including de-activating gyros.
3. Any "no fly zones" need to be identified
4. Remind candidate to talk you through anything that any helper does for them as the test progresses
5. Agree model heights and flight-lines after the take off and first circuit task (b) is completed
6. Discuss the required manoeuvres (and any options) to ensure there is no misunderstanding between the Examiner and Candidate prior to the commencement of the test flights
7. Clearly identify the landing target area.

' A 'CERTIFICATE (Indoor Aerobatic)

Examiners Test Flight Check List

Candidate's Name

BMFA Number

Date

Examiner

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FLIGHT TASK

COMMENTS

(a)	Carry out pre-flight checks as required by the BMFA Safety Codes.	
(b)	Take off and complete a left (or right) hand circuit and overfly the take-off area.	
(c)	Fly one low level left hand circuit with a transition to one high level left hand circuit.	
(d)	Fly one high level right hand circuit with a transition to one low level right hand circuit.	
(e)	Fly a "figure of eight" course with the cross-over in front of the pilot, height to be constant and below 3 metres.	
(f)	Fly one inside loop.	
(g)	Fly one outside loop downwards from the top i.e. a bunt.	
(h)	Fly one double stall turn.	
(i)	Fly 1 circuit with 1 full roll on opposite sides of the circuit	
(j)	Fly a rectangular approach and perform a landing on the designated landing area.	
Answer satisfactorily a minimum of five questions on safety matters from the BMFA Safety Codes and local flying rules.		

'B 'CERTIFICATE (Indoor Aerobatic)

Examiners Test Flight Check List

Candidate's Name	BMFA Number	Date	Examiners

FLIGHT TASK

COMMENTS

(a)	Carry out pre-flight checks as required by the BMFA Safety Codes.	
(b)	Take off and complete a left (or right) hand circuit and overfly the take-off area.	
(c)	Fly one inverted low level left hand circuit with a transition to one inverted high level left hand circuit.	
(d)	Fly one inverted high level right hand circuit with a transition to one inverted low level right hand circuit.	
(e)	Fly a "Cuban Eight" with half rolls.	
(f)	Perform a 2 turn inverted spin or 2 descending 360 degree inverted tight rudder turns.	
(g)	Fly 2 consecutive square loops.	
(h)	Perform a ¾ roll to knife edge flight for a minimum of 5 metres.	
(i)	Perform a 5 second prop hang, climb to a maximum height and perform a stall turn – ¼ roll in climb, ¼ roll in descent.	
(j)	Fly a harrier pass.	
(k)	Perform a rectangular approach and land.	
Answer satisfactorily a minimum of eight questions on safety matters from the BMFA Safety Codes and local flying rules.		

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