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**SUB-115kg (SINGLE-SEAT DEREGULATED) MICROLIGHTS HANDBOOK**

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## **Introduction**

At the end of April 2007, the CAA issued an exemption for a group of microlights to allow them to operate without needing to hold a Permit to Fly. This followed a number of years of campaigning by the BMAA to simplify the airworthiness requirements for lightweight, single-seat microlights.

This document outlines the implications of this rule change and how our members can take advantage of it. It also seeks to explain the operation and responsibilities of owning a deregulated machine, and the framework of support that the BMAA offers.

This category of aircraft is now incorporated in the Air Navigation Order, and Issue 2 of this document seeks to clarify the implications of this to owners.

## **The definition**

The Air Navigation Order (CAP393) was amended by the CAA on 31 January 2008 to include the following text:

‘...an aircraft must not fly unless there is in force... a certificate of airworthiness... The foregoing prohibition... does not apply to flights, beginning and ending in the United Kingdom without passing over any other country, of... a microlight aeroplane which:

- (i) is designed to carry one person only;
- (ii) has a maximum weight without its pilot and fuel of 115 kg;
- (iii) has a maximum wing loading without its pilot and fuel of 10 kg per square metre; and
- (iv) is flying on a private flight.’

Of course, the aircraft must also continue to meet the definition of a microlight, which for a single-seater means a maximum take-off weight not exceeding 300 kg (330 kg for an amphibian or floatplane) and a stall speed not exceeding 35 knots at maximum take-off weight. Most conventional designs are unlikely to reach these limitations.

The BMAA considers that the definition of wing area (when calculating the wing loading) includes that portion of the wing contained within the fuselage section of fixed-wing aircraft. The area of the horizontal stabilising surface is not considered to contribute towards the total wing area of a standard fixed-wing configuration, although a ‘canard’ wing would. The wing area of parafoil-type wings is considered to be the area projected onto a horizontal surface when inflated.

It should be noted that the definition of a ‘self-propelled hang-glider’ still exists, although this was simplified by an amendment to the ANO on 14 April 2010. The criterion of maximum fuel capacity, and the distinction between single and two place machines, are omitted. The definition is as follows:

an aircraft comprising an aerofoil wing and a mechanical propulsion device which:

- (a) is foot launched;
- (b) has a stall speed or minimum steady flight speed in the landing configuration not exceeding 35 knots calibrated airspeed; and
- (c) has a maximum unladen weight, including full fuel of 70 kg.

Separate, more lenient rules govern the use of ‘self-propelled hang-gliders’. The key thing to note is that if the aircraft is launched by use of undercarriage (and not by the legs!) then the aircraft does not qualify as a ‘self-propelled hang-glider’.

## **What the change in rules means**

This change means that for aircraft that meet the above definition it is not necessary to hold a valid Permit to Fly or associated Certificate of Validity. This in turn implies that the design need not meet a particular design or maintenance standard, and the aircraft doesn’t need an annual inspection or check flight.

The aircraft is also not required to be issued with a noise certificate, although it must still comply with the noise regulations for microlight aircraft. This is allowed via a rolling exemption by the CAA, which could be cancelled if they were to find that the rules were being flouted.

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Much research has shown that the requirements for a design to be approved and for an aircraft to hold a Permit to Fly represent a large monetary burden, which has proven to be an effective barrier to development of single seat types. Research has also shown that similar categories exempted from formally proving compliance with airworthiness codes operating worldwide have similar structural safety records as heavier, regulated sport-aviation types. On the other hand, with the absence of a formal requirement to prove airworthiness a significant safeguard has been removed and more emphasis is placed on the owner to understand and take responsibility for his or her aircraft and its operation.

The basic premise, therefore, is that the owner/operator takes full responsibility for the airworthiness of his or her aircraft, and the associated risks. In addition, the energy levels of the aircraft involved are kept low by keeping their empty weight to a minimum, thereby reducing the risk to 3<sup>rd</sup> parties.

This change also means that owners can design and modify their machines largely without reference to the CAA or BMAA.

### **What doesn't change**

The change only allows the aircraft to fly without a Permit to Fly. The rest of the Air Navigation Order (and other legislation) still holds true. In particular, the following rules still apply, as they do to all microlight aircraft:

- The pilot must be in possession of a valid and relevant licence (plus all that goes with it, such as a 'certificate of experience' and medical declaration).
- The aircraft must have appropriate 3<sup>rd</sup> party insurance.
- The aircraft must be registered with the CAA ('personalised' registration letters are permitted).
- The aircraft must display its registration letters in the normal way (CAP 523 on the CAA's website gives details).
- A fireproof metal plate shall be affixed to the aircraft showing the nationality and registration marking (i.e. G-ABCD).
- Radio equipment must be of a type approved by the CAA and licences for those radios held.
- A CAA approved logbook must be kept for the airframe and engine (the BMAA/Pooley's logbook is an acceptable alternative to the CAA publications).
- The Rules of the Air must be obeyed.
- Accident reporting continues as normal.

### **Pilot licensing**

Pilots of this class of microlight must be in possession of an appropriate licence. Generally this is an NPPL (Microlight) with training appropriate to the control system being used (flexwing, 3-axis, parachute, etc). Some credit towards obtaining the NPPL can be taken for existing licences and ratings on other classes of flying machine: up-to-date information can be found on the NPPL website, <http://www.nationalprivatepilotslicence.co.uk/>

### **What types are there?**

Within the definition above, any configuration of flying machine is possible; however, so far they fall into 4 distinct groups:

1. The flexwing 'trike'. This is the same as the heavier flexwing microlight types, and consists of a single delta-shaped wing, like a hang glider, with a 3-wheel fuselage/trike unit suspended beneath and a pusher engine. Control is by weight shift. The pilot manoeuvres the aircraft by moving the fuselage unit relative to the wing by means of a control frame.
2. The three-axis type. This resembles a conventional aeroplane in layout with wing and tail. Variations may include a 'canard' with the 'tail' at the front, and tractor or pusher engine positions. Three-axis generally refers to the conventional control system of elevator, ailerons and rudder that offer control of all three axes of movement (pitch, roll and yaw). However some types may use linked or single roll/yaw controls.
3. The paratrike (powered parachute). This consists of a fuselage/trike unit suspended from a paraglider style wing. Simple versions can be adaptations to convert paramotors from foot- to wheeled-launch. Control is via control lines, which adjust the shape of the canopy.
4. Hybrid types. These can use a combination of weight shift and aerodynamic control, and range from simplifications of three-axis types to sophisticated aerodynamic control additions to flexwing types.

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### **How should I decide which to buy?**

Selection of the right type for you will depend on your personal requirements of performance, cost, ease of storage and your own personal flying aspirations.

When you look at purchasing an aircraft, you should think about the following points:

1. Does the type have a good track record and support? Existing types built in large numbers and having a good reputation provide a good indication of a sound purchase. Email forums provide an opportunity to contact existing owners, learn from their experience and hear their recommendations. New types being developed may promise better performance and exciting new features, but also will naturally need some proving time in service to iron out all the small bugs, which may prove to be frustrating for the first customers. In such cases a proven company with good reputation for support will provide reassurance that such a purchase is sensible. Good UK based support is also highly desirable.
2. Does it really comply with the definition of a deregulated microlight? This is especially important when shopping from a foreign supplier who has not designed their aircraft specifically for the UK market. Often specifications on paper or from the internet may not reflect reality or current production. Weights quoted might be inaccurate. Seek a hard and fast assurance that it will comply with the UK requirements. Empty weight should include all items fixed to the aircraft – that includes the wing, instruments and all actually present and fitted options. Only items that attach directly to the pilot, and fuel and baggage, may be excluded. Don't forget that to have the maximum 115 kg empty weight allowance the wing must be at least 11.5 m<sup>2</sup>.
3. If you're considering buying a used aeroplane - has it been maintained in a safe condition? A thorough look over the aircraft and through its logbook is a good starting point: has it been regularly maintained, has it been in any accidents/have there been any repairs made, etc. Be very wary of aircraft without logbooks!

### **I've already got a microlight that fits into this category**

If your aircraft fits into the above definition, then it may now be operated under the new rules rather than on a Permit to Fly and Certificate of Validity. Please complete the form at the back of this handbook and send it to the BMAA to let us know if this is what you intend to do.

Note that if over time the weight of your aircraft increases so that either the empty weight or empty wing loading brings it out of the definition for the category, you might need to get a new Permit issued for the aircraft (see below).

### **I'm about to buy a new microlight that I want to fly under the new rules**

The first step is to check that your aircraft does indeed meet the above definition. If it does, you need to register the aircraft with the CAA using form CA1 which can be downloaded from the CAA's website, <http://www.caa.co.uk/>. The CAA will seek confirmation that the aircraft is suitably insured (if the aircraft is in build then this can be deferred until the aircraft is complete).

We would also appreciate it if you could complete the form at the back of this handbook and send it to the BMAA to let us know your intentions.

### **I've got a microlight that has been operated in this category but now no longer complies with the definition**

If you have been operating your aircraft in this category but subsequently find that the weight or wing loading has increased such that it no longer meets the definition, you need to do one of two things: either reduce the weight or wing loading until the definition is met, or get the aircraft issued with a Permit to Fly.

A Permit to Fly can only be issued if the design meets an appropriate airworthiness standard such as BCAR Section S. If the aircraft has previously held a Permit to Fly, then it should be relatively straight forward to reinstate the Permit provided that it can be shown to meet the approved design standard (e.g. an inspection and confirmation from the original factory that the aircraft is to the correct standard) and can be shown to have been maintained according to the standard maintenance instructions for that type (e.g. appropriate maintenance actions recorded in the logbooks). If you wish to get a Permit on such an aircraft, contact the Technical Office for advice.

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If the aircraft has not previously held a Permit to Fly, then it is unlikely that a Permit can be issued unless the aircraft was manufactured by a CAA approved organisation to an approved design standard.

### **The BMAA's involvement**

Once an owner declares to the BMAA that an aircraft is to be operated as a 'deregulated' machine, the Association takes no further part in its airworthiness.

The Association recognises that technical assistance should be available to members who wish to operate aircraft in this category. Due to exposure to liability, the Technical Office can only offer advice on the basis of BCAR Section S. (i.e. an answer to a query on any design aspect of a sub-115 machine will be given in relation to the advice that would be given if it were operating on a Permit to Fly and approved to BCAR Section S).

It should also be noted that BMAA inspectors and check pilots are not currently authorised to inspect or check fly these aircraft with their official 'BMAA hats' on: if you seek advice from any third party, this is strictly between you and that person and the BMAA accepts no liability for any advice or information given.

### **General advice on operating a deregulated microlight**

In order to fly this class of microlight, it is a requirement that you have a suitable pilot's licence. When you learn to fly you pick up all sorts of useful advice as to how to go about doing so safely: dig out this advice and use it! You will be relying more heavily on your own assessment and observation of the day-to-day condition of your aircraft than you might normally be used to. If something is 'against your better judgement', don't fly, think about it carefully instead – perhaps sleep on it!

Don't forget to record flying hours, maintenance, modifications and other useful information in the logbook(s). This will help you keep your aircraft in tip-top condition, and help you to sell it later down the line.

### **Maintenance**

In terms of maintenance, you are strongly advised to follow the manufacturer's advice. You might also consider using the BMAA's generic microlight maintenance schedule (TIL 020) as a basis or supplement. Operating data for aircraft that operate on Permits to Fly (TADS or operators/maintenance manuals) might give food for thought as to what areas to look at. Other things that might hint towards something becoming unsafe might include:

- visible cracks in parts
- perishing rubber or plastic items
- fabric that is discoloured, fraying or becoming easily damaged
- damaged stitching
- distorted or bent parts
- corrosion
- broken wires/strands/parts

You are strongly advised to source replacement parts from the original manufacturer of the aircraft. Replacement parts such as wires (or other critical items that are 'made up') might best be sourced from manufacturers of 'Approved' aircraft if they're not available from the original manufacturer. The use of correct materials and parts can often be vital in retaining the strength and integrity of a structure.

### **Designing your own aircraft, modification or repair**

When designing your own aircraft, modification or repair, there are almost limitless references you can use to help work out whether something is safe or not. You should bear in mind that it is your responsibility to satisfy yourself that your aircraft is safe to fly and that the design is fit for purpose. Bear in mind that strength is only one aspect of the design: don't forget to consider other aspects such as centre of gravity position, stability, control, aerodynamics, performance, handling and so on. You might consider performing some calculations to work out whether a design is safe, or perform some load testing, or some flight-testing. Don't forget that what might seem like a fairly innocuous change can sometimes have a significant knock-on effect on other aspects of the aircraft.

Amongst the references available are the following:

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**BRITISH MICROLIGHT AIRCRAFT ASSOCIATION  
TECHNICAL INFORMATION LEAFLET**

No.045

Issue 2

August 2011

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BMAA reference (all available from the BMAA website, <http://www.bmaa.org/>)

- Technical Information Leaflets (TILs) on a variety of subjects
- Airworthiness forms (AWs) including inspection checklists and flight test schedules
- Type Approved Data Sheets (TADS) for permit aircraft

CAA references (all available from the CAA website, <http://www.caa.co.uk/>)

- BCAR Section S (CAP 482)
- Civil Aircraft Airworthiness Information and Procedures (CAAIP) (CAP 562)
- Amateur built aircraft (CAP 659)

FAA references (all available from the FAA website, <http://www.faa.gov/>)

- AC43-13 1b Acceptable methods, techniques and practices – aircraft inspection and repair
- AC20-27f Certification and operation of amateur-built aircraft
- AC90-98a Amateur-built aircraft and ultralight flight testing handbook

EASA references (all available from the EASA website, <http://www.easa.eu.int/>)

- Certification specifications for very light aeroplanes CS-VLA
- Certification specifications for sailplanes and powered sailplanes CS-22
- Certification specifications for normal, utility, aerobatic and commuter category aeroplanes CS-23

Miscellaneous books/references

- Wood handbook, US Department of Agriculture, Forest Service (search on the internet for 'USDA wood handbook')
- Aviation mechanic handbook, Dale Crane
- Analysis and design of flight vehicle structures, Bruhn
- Formulas for stress and strain, Roark
- Understanding aircraft structures, Jeremy Liber
- The design of the aeroplane, Darrol Stinton
- Simplified aircraft design for homebuilders, Dan Raymer
- The properties of aluminium and its alloys, Aluminium Federation Ltd
- Metallic materials properties development and standardization (MMPDS), USDOT (available from <http://www.ntis.gov/>)
- ESDU data sheets (available as reference in major libraries)

Note that the above is not an exhaustive list, nor does it guarantee that if these references have been consulted that the design is safe!

Finally, it is the owner's responsibility to ensure continued compliance with the definition of this aircraft class. Remember that if weight creeps up (as it often does over time) then at some point it may no longer fit into this category of microlight – check the weight occasionally to make sure.

Approved for issue



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British Microlight Aircraft Association

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Notice to BMAA of intention to operate a microlight aircraft under the 'deregulation' rules

Aircraft registration:	G- _ _ _ _	Aircraft type:	
Owner's name:		BMAA number:	
Address:		Email address:	
Phone number:			
		Notes:	
Aircraft empty weight, kg:		Must include all modifications, fixtures and instruments. Excludes pilot weight and fuel. Must be 115 kg or less.	
Projected wing area, m <sup>2</sup> :		Projected wing area includes that section of the wing contained within the fuselage on fixed-wing types.	
Empty wing loading, kg/m <sup>2</sup> :		Empty weight divided by wing area. Must be 10 kg/m <sup>2</sup> or less.	
Number of seats		Must be one!	
I confirm that I have read the guidance information given in TIL045 and understand that it is my sole responsibility as the owner of the above aircraft to determine whether the aircraft is fit for flight. I hereby notify the BMAA that I withdraw my aircraft from the Permit to Fly system.			
Signed:	Name:		Date: