



LAA TYPE ACCEPTANCE DATA SHEET
TADS 161 CFM SHADOW D, D-D
TADS 206 CFM STREAK SHADOW SA
TADS 206A CFM STAR STREAK SHADOW SA-II
TADS 206B CFM STREAK SHADOW SA-M

Issue 6	Introduction of other Shadow variants and expanded information	Dated 24/01/18	JP
Revision A	Addition of Standard Modifications at section 3.6. Amended descriptions of Streak Shadow and Star Streak.	Dated 01/03/19	JV
Revision B	Addition of Safety Spot articles	Dated 28/11/19	JH

This TADS is intended as a summary of available information about the type and should be used during the build, operation and permit revalidation phases to help owners and inspectors. Although it is hoped that this document is as complete as possible, other sources may contain more up to date information, e.g. the manufacturer's website.

Section 1 contains general information about the type.

Section 2 contains information about the type that is **MANDATORY** and must be complied with.

Section 3 contains advisory information that owners and inspectors should review to help them maintain the aircraft in an airworthy condition. If due consideration and circumstances suggest that compliance with the requirements in this section can safely be deferred, is not required or not applicable, then this is a permitted judgement call. This section also provides a useful repository for advisory information gathered through defect reports and experience.

Section 1 - Introduction

1.1 UK contact

The original manufacturers are no longer in existence.

Spares and advice available from Fiona Luckhurst at the Shadow Flight Centre, Hangar 4, Old Sarum Airfield, Salisbury, SP4 6DZ.

Tel: 01722 410567
Email: info@shadowflightcentre.co.uk
Website: www.shadowflightcentre.co.uk

1.2 Description

The CFM Shadow is a two seat (in tandem) high wing, pod and boom aircraft with a pusher engine and tricycle undercarriage, designed by David Cook and supplied in kit form by CFM Metal-Fax and later CFM Aircraft of Leiston, Suffolk. The aircraft was produced in a number of variants over the years which are detailed below.

The airframe consists of a fabric covered wing of mixed aluminium, wood and composite construction, a forward fuselage/cockpit fabricated mainly from Fibrelam (honeycomb board) with moulded composite fairings, fabric covered aluminium tube frame tail surfaces and an aluminium alloy tailboom.

Originally designed for the single ignition Rotax 532 two stroke engine, most are now fitted with the dual ignition Rotax 582 which replaced the 532 model. The higher powered two stroke Rotax 618 is also approved, with E type gearbox. The Rotax B gearbox is standard with 532 and 582 engines, although the E type gearbox can also be fitted to provide an electric start facility. The four stroke Rotax 912 UL is also cleared for use in the Streak Shadow and Starstreak. The Jabiru 2200A has been installed in one Starstreak.

Any Shadow Series D or Streak Shadow can be converted to an SSSR (single-seat de-regulated microlight) with an MTWA of 300 kg. Some aircraft can be cleared as an SSSR at a higher



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MTWA if that were cleared as single seaters at a higher MTWA before the microlight definitions changed under grandfather rights (e.g. the Streak Shadow Series M) allowing a greater payload to be carried.

Various manufacturers' propellers have been installed on the LAA Shadow fleet including Arplast, Ecoprop, GSC, Precision and Warp Drive. Note that the only propeller(s) approved for an individual aircraft are those listed on the individual aircraft's Operating Limitations document or in the [PTL/1](#) (Propeller Type List) for the type.

Description of Shadow Types

Shadow Series B and C

These types were two-seat, long wingspan microlights available only as a BMAA kit or series factory built microlight aircraft; they are not LAA aircraft types. The standard engine was the Rotax 447 or 532. The types were replaced by the Shadow D series.

Shadow Series D

The Series D is a two-seat microlight version with long wingspan. It is effectively a slightly modified C with small reinforcements and the wide body cockpit nacelle. The type was available either as an LAA kit or as a BMAA factory-built microlight. The longer wing combined with the higher power Rotax 582 installed in the Series D was thought to reduce aileron response. The factory closed before many of the Series D were sold.

Streak Shadow

The Streak Shadow is a two-seat SEP (Group A) version with new foam/glass fibre wings with a shorter span and thinner wing section. It was available as an LAA kit only and initially as an SEP (Group A) type only. Installed engines included the Rotax 532, 582, 618 and 912. The use of the heavier Rotax 912 engine found in some later examples resulted in the aircraft generally being single seaters even with the 408 kg MTWA. After a change to the definition of a microlight, with minor modification and depending on the weight and engine fit, some examples can be converted into a two-seat microlight. There are two different cockpit nacelles found on the Streak Shadow, the later 'wide body' version having an increase width of approximately 2 inches. The 'narrow body' version could only meet the microlight stall speed requirements when flown up to a MTWA of 390 kg (rather than 408 kg) probably due to the narrower cockpit nacelle producing less lift. See below for expanded information on the Streak Shadow and SEP (Group A)/microlight classification differences.

Streak Shadow Series M

This was a single-seat microlight version of the Streak Shadow that was available prior to the change in the microlight definitions and had a MTWA of 325 kg. Standard engines were the Rotax 532, 582 or 618. The aircraft was available as an LAA kit only. The type was largely made obsolete as the later microlight rules allowed most Streak Shadows to qualify as two-seat microlights with minor modifications.

Star Streak

The Star Streak was a two-seat SEP (Group A aircraft), similar to Streak Shadow but with wings of further reduced area (narrower chord) for higher speed and a shorter fuselage boom than the Streak. It was available as an LAA kit only and the standard engine was the Rotax 582 although LAA administered examples have been completed with Jabiru 2200A, Rotax 912 UL and 618 engines.

Streak Shadow Type Classification Background Information

Regarding the Streak Shadow, the type's Airworthiness Approval Note (AAN) includes some expanded information that may be of interest as to the aircraft's type classification.



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The Streak Shadow was originally introduced in the late 1980s. At that time the maximum permitted gross weight for a microlight aircraft was defined as 390 kg and the maximum permitted wing loading for a microlight was defined as 25 kg/sq metre. With a maximum gross weight of 408 kg, the Streak Shadow was therefore classified as a 'Group A' aircraft rather than a microlight.

Another variant, the Streak Shadow Series M (CFM designation Streak Shadow SA-M), was introduced shortly afterwards which was a single seater version of the Streak Shadow, with a max MTWA limited to 325 kg. As this variant has a MTWA of less than 390 kg and a wing loading less than 25 kg/sq metre it has always been classified as a microlight.

In the mid-1990s, the original kit manufacturer, CFM Metal-FAX, introduced a design change to the aircraft which widened the cockpit by 2 inches for increased comfort in the cockpit.

Following the change in the microlight definition to a maximum gross weight of 450 kg and the option of a stall speed not exceeding 35 kts as an alternative to a wing loading of less than 25 kg per square metre, the classification of the Streak Shadow was reviewed by the LAA. While the maximum gross weight at 408 kg was within the 450 kg microlight limit, the wing loading of more than 30 kg/sq metre significantly exceeds the microlight limit of 25 kg/sq metre. Exhaustive stall speed tests have been carried out with various Streak Shadows to measure the true minimum achievable airspeed in the landing configuration and this has been determined to be over 35 kts CAS with full flap at max gross weight when the aircraft is in standard configuration. An unmodified Streak Shadow, either with the wide or narrow cockpit is therefore outside of the microlight definition and remains classified as an SEP (Group A) aeroplane.

Further work by the former kit manufacturers, CFM Aircraft Ltd, resulted in a modification which fits an elevator gap seal and increases the elevator effectiveness of the aircraft. This modification allows the wide-cockpit version of the Streak Shadow to achieve a 35 kt stall speed at a maximum gross weight of 408 kg, power off with full flap. With this modification the wide-cockpit Streak Shadow can be re-classified as a microlight.

With the elevator gap seal modification in place, the stall speed of the narrow-cockpit version of the Streak Shadow was found to be approximately one knot higher than that of the wide cockpit model. With the narrow cockpit version it was necessary to reduce the maximum gross weight to 390 kg in order to reduce the stall speed to the 35 kt figure required to meet the microlight definition. With the elevator gap seal in place, the narrow-cockpit version of the Streak Shadow may be reclassified as a microlight providing the gross weight is also reduced to 390 kg.

Section 2 – Mandatory information for owners, operators and inspectors

At all times, responsibility for the maintenance and airworthiness of an aircraft rests with the owner. Condition No 3 of a Permit to Fly requires that: "*the aircraft shall be maintained in an airworthy condition*".

2.1 Fast Build Kit 51% Compliance

The kit was accepted under the former 500 hour rule. Kit production ceased prior to the introduction of the 51% rule.



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2.2 Build Manual

A CFM Build Manual describes the construction of the kit.

2.3 Build Inspections

Build inspection schedule: 7 (CFM Shadow/Streak Shadow/Starstreak).
 Inspector approval codes A-A, AC-1, AC-2, K and (for microlights only) M. Inspector signing off final inspection also requires 'first flight' endorsement.

2.4 Flight Manual

Refer to CFM Shadow Pilot's Manual.

2.5 Mandatory Permit Directives

Applicable specifically to this aircraft type:

MPD Number	Description	Applicability
MPD 1998-013 R2	Rudder fin post	Shadow Series B, C and D, Streak Shadow and Starstreak
MPD 2001-002 R2	Cracking of tailplane spar leading edge spigot tube	All variants
MPD 2002-004 R1	Propeller hub mounting bolts	Shadow Series D, D-D and Streak Shadow powered by Rotax 582 and fitted with Precision Propeller
MPD 2003-005 R1	Installation of ASI and altimeter correction placards	Shadow Series D and D-D
MPD 2004-007 R1	Main undercarriage	All Shadow Series B, B-D, C, C-D, D and D-D, Streak Shadow and Starstreak
MPD 2004-008 R1	Nose wheel undercarriage	All Shadow Series B, B-D, C, C-D and D-D, Streak Shadow and Starstreak
MPD 2005-003	Elevator flutter	Amateur built Shadow Series D, D-D, Streak Shadow and Starstreak

Notes on the above can be found in Para 3.4 (where applicable).

Also check the LAA website for MPDs that are non-type specific ([TL2.22](#)).

2.6 LAA Required Modifications (including LAA issued AILs, SBs, etc)

Ref Number	Description	Applicability
MOD/161/001	Installation of ASI and altimeter correction placards	Shadow Series D and D-D
MOD/206/002	Inspection of nose undercarriage, bungee pretension and bungee condition	All amateur built Shadow Series D, Streak Shadow and Starstreak



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MOD/206/003	Elimination of elevator flutter (standard damper mod SM11419 or agreed alternative)	All Streak Shadow, Starstreak and Shadow Series D operating on an LAA Permit to Fly
MOD/206/004	Change to Precision Propellers to replace aluminium pitch blocks by moulded plastic pitch blocks	All aircraft fitted with Precision Propellers
MOD/206/005	Inspection of F153 hanger tube brackets	All variants
MOD/206/006	Incorporation of a front hangar bracket support (CFM SB 9 refers)	All variants
MOD/206/007 Iss 1	Fuel tank inspection (see also LAA/AWA/17 11)	All variants operating on an LAA permit to Fly

Note: [MPD 2004-007 R1](#) mandated the replacement of the original design of main undercarriage with one of the following replacement designs:

1. Crosbie upgraded pultrusion rod retrofit main undercarriage (LAA mod [SM11121](#))
2. Cook aluminium retrofit main undercarriage (LAA mod [SM11337](#))
3. Wighton/CFM factory composite main undercarriage (LAA mod 11132)

The CFM optional elevator gap seal is mandatory on microlight two seaters to achieve microlight stall speed requirement.

2.7 Additional engine operating limitations to be placarded or shown by instrument markings

A number of different engines have been installed on the LAA Shadow fleet, therefore:

1. Refer to the engine manufacturer's latest documentation for the definitive parameter values and recommended instruments.
2. Where an instrument is not fitted, the limit need not be displayed.

2.8 Control surface deflections

Ailerons	Up	20°
	Down	10°
Elevators	Up	20°
	Down	16°
Elevator tab	Up	22°
	Down	20°
Rudder	Left	25°
	Right	25°
Flap	Down:	30°

2.9 Operating Limitations and Placards

There are a number of different variants of the Shadow on the LAA fleet and within each variant there are various engines, differences and modifications. Therefore, refer to an individual aircraft's Operating Limitations document for the information pertinent to that specific aircraft where required.



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LIMITATIONS

1. Maximum number of occupants authorised to be carried: Refer to individual aircraft's Operating Limitations

2. The aircraft must be operated in compliance with the following operating limitations, which shall be displayed in the cockpit by means of placards or instrument markings:

2.1 Aerobatic Limitations

SEP (Group A) aircraft:

Aerobatic manoeuvres are prohibited.
Intentional spinning is prohibited.

Microflight aircraft:

The aeroplane is permitted to fly only for non-aerobatic operation. In this context, non-aerobatic operation includes:

- i. Any manoeuvre necessary for normal flying.
 - ii. Intentional stalls from level flight.
 - iii. Steep turns in which the angle of bank does not exceed 60 degrees.
- Intentional spinning is prohibited.

2.2 Loading Limitations

Maximum Total Weight Authorised: Refer to individual aircraft's Operating Limitations

CG Range: Refer to individual aircraft's Operating Limitations

Datum Point is: A point 24.0 inches forward of the leading edge of the wing at the root

2.3 Engine Limitations

There are a wide variety of engines installed in the type, therefore, refer to the engine manufacturer's data for Maximum RPM and Maximum continuous RPM figures.

2.4 Airspeed Limitations

Maximum Indicated Airspeed (Vne): 140 mph

Maximum indicated airspeed with flaps extended (Vfe): 65 mph

2.5 Other Limitations

The aircraft shall be flown by day and under Visual Flight Rules only.

Smoking in the aircraft is prohibited.

Additional Placards:

"Occupant Warning - This Aircraft has not been Certificated to an International Requirement"

A fireproof identification plate must be fitted to fuselage, engraved or stamped with aircraft's registration letters.

For microflight aircraft, additional microflight weight placard must be fitted as described in [TL 2.11](#) regarding empty weight and payload.

2.10 Maximum permitted empty weight

Note: The Maximum permitted empty weight is applicable to microflight variants only.

Model	Engine	MTWA	Maximum empty weight
Streak Shadow SA	Rotax 532	408 kg	221 kg
Streak Shadow SA	Rotax 582	408 kg	218 kg
Streak Shadow SA	Rotax 618	408 kg	213 kg
Streak Shadow SA	Rotax 912 UL	408 kg	226 kg



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Streak Shadow SA	Rotax 532	390 kg	203 kg (narrow body microlight)
Streak Shadow SA	Rotax 582	390 kg	200 kg (narrow body microlight)

Section 3 – Advice to owners, operators and inspectors

3.1 Maintenance Manual

Refer to CFM Streak Shadow Service Manual. The Service Manual includes a maintenance schedule.

For engine information, consult the relevant engine manufacturer’s schedule.

3.2 Manufacturer’s/Standard Options

The listing below shows the factory options that have been accepted by the LAA.

1. Narrow body fuselage (became obsolete with introduction of wide body fuselage)
2. CFM Slipper tank
3. CFM Extended footwell
4. Crosbie extended footwell
5. CFM engine cooling airscoop, standard for 618 engine, optional on 582
6. CFM Single or dual controls

The Streak Shadow SA was designed as an SEP Aeroplane and is normally classified as such. Some examples are however classified as microlights. In order to be classified as a microlight, the Streak Shadow must be in one of the following configurations:

- a. Limited to single seat use, narrow body, with the rear seat blocked off by a special blocking bar, reduced fuel tank capacity, max gross weight restricted to 716 lbs. This version was designated Streak Shadow SA-M.
- b. Narrow body, two seat, with elevator gap seal fitted and flap travel not less than 30°. Max gross weight restricted to 390 kg. Remains designated Streak Shadow SA.
- c. Wide body, two seat, with elevator gap seal and flap travel not less than 30°. Max gross weight 408 kg. Remains designated Streak Shadow SA.

3.3 Manufacturer’s Information (including Service Bulletins, Service Letters, etc)

In the absence of any over-riding LAA classification, inspections and modifications published by the manufacturer should be satisfied according to the recommendation of the manufacturer. It is the owner’s responsibility to be aware of and supply such information to their Inspector.

Reference	Description	Applicability
SB 7	Light/reflective stripe on dark-painted wings to minimise solar heating	Shadow Series B, B-D, C, C-D, Streak Shadow Series S-A1 and S-A
SB 8	Alloy main wheels – remove sharp edges before assembly	Shadow Series B, B-D, C, C-D, Streak Shadow Series S-A1 and S-A
SB 9	Support for front hanger brackets – optional reinforcement	Shadow Series B, B-D, C, C-D, Streak Shadow Series S-A1 and S-A.
SB 11	Teleflex (optional)	Shadow Series B, B-D, C, C-D, S-A, S-AI, SA-M and S-S
SB 12	Rudder fin post – cracking	Shadow Series B, C and D, Streak Shadow and Starstreak



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SB 13	Inspect rudder pedal hinges for wear/security (advisory)	All variants with >1000 hrs flight time
SB 14 Iss 2	Cracking of tailplane spar leading edge spigot tubes	All variants
SB 16	Propeller mounting bolts	Shadow Series D, D-D and Streak Shadow powered by Rotax 582 and fitted with Precision Propeller

3.4 Special Inspection Points

1. Microlight category Shadows: many CFM aircraft are in the microlight category and unless inspectors have a thorough knowledge of the type it may not be obvious whether the example being inspected is a microlight or not. The only definitive way to tell is to check the aircraft's Permit to Fly documents.

The title block on the heading page of the Permit will specify the aircraft's classification as either 'Microlight' or 'Aeroplane', (or if it says 'Small Light Aeroplane' then this should be interpreted as a 'Microlight'). If a microlight, then the Inspector should check that the aircraft has been issued with a CAA Noise Certificate showing correct data with regard to propeller, engine, intake and exhaust detail.

2. [MPD 1998-013 R2](#) Rudder fin post
There have been examples of cracking at the top of the rudder fin post where the fin post enters the boom tube. In addition there is evidence that some aircraft have been unofficially modified in this area. LAA inspectors should be aware that in 1998 the CAA published the above MPD. This requires immediate inspection and replacement if cracked, or modification prior to next Permit renewal inspection, of the rudder fin post on CFM Shadow Series B, C and D, Streak Shadow and Star Streak aircraft. Compliance with this MPD must be entered into the aircraft log book. Refer also to CFM [SB 12](#) and if required, owners/inspectors should contact the Shadow Flight Centre for further information.

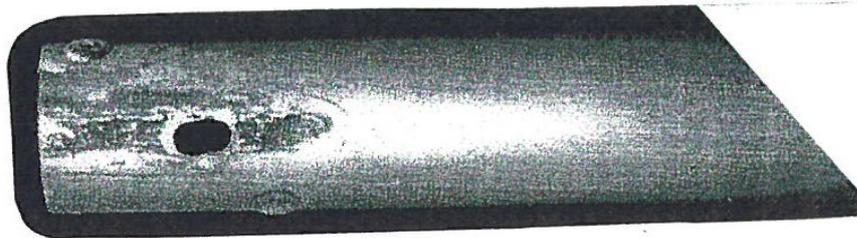
Note: this MPD was reissued by the CAA to extend its applicability to cover all examples of the types affected, not just the microlight versions.

3. [MPD 2001-002 R2](#) Cracking of tailplane spar leading edge spigot tube
Where the tailplane leading and trailing edge tubes plug into the boom tube, check that cracking/fretting is not occurring on the tailplane tubes. This problem can result in disconnection of the front spar and loss of control of the aircraft. Cross refer to CFM [SB 14 Issue 2](#) which includes a requirement for a check at each routine inspection including pre-flight checks for excessive movement around the leading and trailing edge joints of the tailplane to boom fixings. Every 20 hours, the tailplanes must be de-rigged and a close visual inspection carried out. Note: this MPD was reissued by the CAA to extend its applicability to cover all examples of the types affected, not just the microlight versions. Furthermore, the inspection requirements were amended in issue 2 of the SB.
4. [MPD 2002-004 R1](#) Propeller hub mounting bolts
There were two serious incidents reported of failure of the propeller hub mounting bolts used on CFM aircraft fitted with Rotax engines and Precision propellers. In both cases the propeller came off in flight. Bolts must be replaced with new bolts every 25 hours. This MPD affects only those aircraft with threaded holes in the gearbox output flange and not those with plain holes. Cross refer CFM [SB 16](#)
5. [MPD 2003-005 R1](#) Installation of ASI and altimeter placards

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Due to the position of the static port on the CFM Shadow Series D and D-D aircraft, the ASI and altimeter on these aircraft over read. In order to allow more accurate flight planning and altitude reporting, this MPD introduces ASI and altimeter correction placards and an addendum to the Pilot's Handling Notes. Note that there are no changes as to how the aircraft should be flown. The stall, manoeuvring and never-exceed speeds occur at the same indicated airspeeds as before. The information in this bulletin merely aids flight planning and navigation by giving the correct calibrated airspeeds for use in ground speed calculations. [MOD/161/001](#) refers.

6. [MPD 2004-007 R1](#) Main undercarriage
 Following a number of undercarriage failures in service, the original CFM-supplied main



undercarriage was outlawed by the issue of this MPD. Publication of this MPD effectively grounded all affected aircraft immediately because at the time of publication replacement modified undercarriages were not available. The Shadow is only permitted to fly in the UK with one of the accepted alternative main undercarriages listed under paragraph 2.6 'LAA Mandatory Modifications', above.

Inspectors should be careful to ensure that the problem illustrated below of elongated holes being introduced into the drag struts when fitting new undercarriages has not occurred to any aircraft they inspect.

7. [MPD 2004-008 R1](#) Nose wheel undercarriage
 Compliance: Before next flight and subsequently at each 50 hour and annual check.
 Background: Experience from incidents has shown that there is a possibility of nose leg damage or failure if the nose leg bungee is either insufficiently pre-tensioned or has become worn in service. Cross refer to [MOD/206/002](#).

Actions Required:

- a. Place the aircraft on level ground, and drain all fuel from the fuel tank.
- b. With a person of average weight (between 77 kg and 90 kg) occupying the front cockpit and with the rear seat empty, visually check that the nose wheel suspension is on the stop, i.e. there is no deflection of the nose leg suspension from the fully extended position.
- c. Check visually that when an additional weight of 10-20 kg is applied to the top of the nosecone (in the vicinity of the top of the instrument panel) the nose wheel suspension comes just off the stop.
- d. If the nose leg is off the stop at stage 2 above, or does not come off the stop at stage 3 above then the nose leg bungee is incorrectly installed or has deteriorated in condition. It must therefore be replaced in accordance with the CFM instructions, setting the pre-tension so as to satisfy the criteria of stage 2 and 3 above.
- e. Inspect the nose leg in the vicinity of the nose leg suspension stop cable. If there is evidence of wear of the nose leg through contact with cable, more than 0.005" deep, then the nose leg must be replaced. On completion, check that the bungee pre-tension has been set such that the criteria of stages 2 and 3 above are complied with.
- f. Inspect the bungee for signs of fraying, rotting of the outer braid or necking/failure of the internal rubber cords. If any of these conditions exist then the bungee must

be replaced in accordance with the CFM instructions and complying with the criteria of stages 2 and 3 above.

g. Refill fuel tank as required, to avoid condensation forming in fuel tanks.

8. [MPD 2005-003](#) Elevator flutter

Following problems with elevator flutter, this MPD requires an approved modification to prevent flutter. The standard 'fix' is the addition of a flutter damper by LAA Mod [SM11419](#) which consists of friction washers at the rear seat control column pivot. It is essential to check that the friction level is set as described in the LAA Mod. On single control examples (ie where there is no rear control column) the friction damper is installed at the pivot bolt of the front control column. This involves a minor alteration of the roll control stop to clear the damper. Cross refer [MOD/206/003](#).

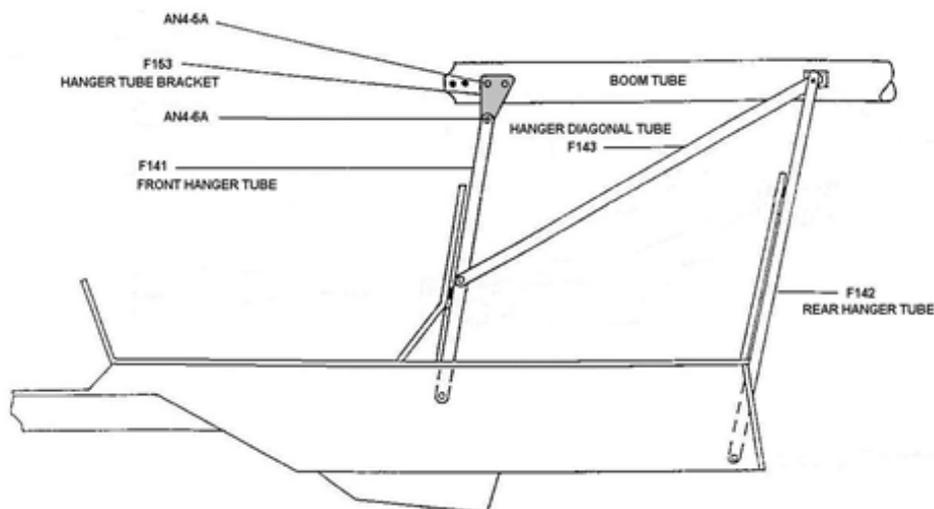
9. [MOD/206/005](#) Inspection of F153 hanger tube brackets (LAA classification A)

Compliance: At next, and thereafter at each subsequent Permit Renewal Inspection.

Background: Following a cracking failure of an F153 Hanger Tube Bracket on an aircraft in Argentina, the following inspection was introduced to monitor these brackets to see if a significant problem exists. There have been no reports in the UK of any such failure of these brackets. Check for any signs of looseness in attachment of wing centre section to fuselage boom which might indicate cracking in the hanger brackets.

This inspection will require two people.

- a. Firmly chock the main wheels to prevent them moving during the inspection.
- b. From the rear cockpit, equipped with a good light source, inspect the F153 plates for cracks and any evidence of movement or fretting within the hanger tube and the bolts for tightness.
- c. Whilst inspecting the plates, ask a helper to gently push the wing fore and aft and check, visually or by feel, for any signs of movement between the plate and the hanger tube.
- d. Next try using a firm vertical force applied at the point where the wing strut attaches the wing. Warning: do not exert lifting pressures at the wing tip. Repeat this on the other side.
- e. Any evidence of undue movement or fretting should be investigated. If unsure the F153 may be removed from the aircraft for a detailed inspection.
- f. If everything appears normal, then return the aircraft to service.
- g. Any adverse finding should be reported to the LAA.





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Certification: unless the F153 is removed and/or rectification required Inspector involvement is not required for this inspection. Nevertheless, compliance with this inspection should be recorded in the aircraft logbook.

10. [MOD/206/006](#) Front hangar bracket support (LAA classification A)

Compliance: Within 5 hours flying after 16/4/08.

Background: the failure of an F153 front hanger tube bracket on a CFM Streak Shadow has highlighted the need for constant vigilance in this area of the Shadow's airframe. This MOD requires that owners or operators ensure that the plywood bracket support, recommended by CFM [SB 9](#), is fitted.

Actions Required: inspect the aircraft and ensure the plywood support is fitted. If fitted, no further action is required. If the plywood bracket support is not fitted, then a bracket needs to be constructed and fitted in accordance with CFM [SB 9](#). Drawings and/or parts for this bracket support are available from the Shadow Flight Centre.

Certification: in all cases a logbook entry is required stating that LAA MOD/161/003 has been complied with.

11. MOD/206/001 Slipper tank

This was cancelled as it was superseded by [MPD 2004-007 R1](#)

12. With Rotax 912 UL engine option, the throttle spring on the carburettors must be adjusted so that the system does not have a strong tendency to spring to 'full throttle' when the throttle knob is released, or require a strong pull to keep it in the closed position.

13. If a Rotax engine is fitted, the appropriate Rotax 2-stroke or Rotax 912 series installation checklist is to be completed (apart from flight test section) as part of the final inspections prior to applying for Permit to Fly.

14. If a Rotax 912 engine is fitted, a vapour return line must be fitted to the fuel system if unleaded Mogas fuel is to be used. This returns the excess fuel and vapour to one of the two fuel tanks. Returning it to the fuel supply pipe downstream of the tank outlet is not acceptable.

15. Fabric will lose strength with age, particularly if not protected from ultra-violet light by a conventional coloured dope or paint finish. Fabric finished with clear dope has a very short life.

16. Check the wings are not warped. Some wings have been found to be warped as supplied by CFM. Asymmetric wing warps can result in problems with roll trim particularly at high air speeds.

17. Due to use of epoxy-bonded wing spars, the strength of wing spars would be reduced if spar is subject to excessive solar heating. To reduce temperature rise in the wing spar, if the wings are of a dark colour, CFM called for a white or reflective stripe over the wing spar area on the wing upper surfaces. CFM [SB 7](#) refers.

18. Following a heavy landing, in addition to normal heavy landing checks, check boom attachments to the cockpit, firewall attachments to the fuselage and engine mount attachments to the firewall for signs of damage.

19. Check for signs of cracking/fretting at transport joint between outer wings and centre section where the D-box leading edge ply butts together. Forward loads on the wings in flight may cause progressive compression damage in this area.

20. Check for overstress/heat/wear damage to nylon tail bumper. If tail bumper is in a



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weakened condition, it may not be effective in protecting fin and rudder from damage.

21. With Crosbie retro-fit main undercarriage, ensure that undercarriage drag struts are properly drilled for attachment bolts and bolt holes have not been 'slotted' to fit the job.
22. On the Shadow Series D, watch the empty weight.
23. Note that LAA inspectors are only permitted to sign-off LAA versions, and should not mistakenly inspect and sign-off BMAA aircraft (and vice versa).
24. In addition to the use of shorter span wings, the tailplane incidence of the Streak Shadow SA and SA-M differs from that of the microlight Shadow Series B, C and D aircraft.
25. An Airworthiness Alert [LAA/AWA/17 11](#) was produced in November 2017 highlighting potential problems with Shadow fuel tanks and associated inspections to be carried out. Further information can be found in Airworthiness Information Leaflet [MOD/206/007 Issue 1](#) and [MAAN 2236 Issue 1](#).

| 3.5 Operational Issues

- Check that elevator flutter damper is effective in preventing elevator flutter when stick is released, check when flying through turbulence and not just in smooth air
- Check lateral trim at all speeds to ensure that wing is not warped.
- Check engine cooling especially if cooling duct not fitted.

| The following Safety Spot articles are relevant to Shadow aircraft

<i>Light Aviation</i> issue March 2008	<i>Hang brackets</i>
CFM shadow on rebuild was found with a failure in one of the hang brackets not suspected to be because of heavy landing incident. SB 9 required to reinforce this bracket	
<i>Light Aviation</i> issue July 2013	<i>Fin post failures</i>
Unusual movement noticed in fin post of Shadow and cracks found by second lower set of rivets. Damage could have been exacerbated by heavier engine and pull starts with aircraft resting on fin post.	
<i>Light Aviation</i> issue June 2016	<i>Strut/wing connection failure</i>
Fabrication of strut not to drawings, use of epoxy and rivets increased stress as adhesion has broken down and corrosion products occupy greater volume overstressing and cracking attachment.	
<i>Light Aviation</i> issue December 2017	<i>Fuel tank inspection</i>
Degrading Fiberlam fuel tanks suspected to be the cause of engine stoppage in Ireland. If fiberlam is leaking it must be replaced	



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3.6 Standard Modifications

The following Standard Modifications have been approved on the type. The Standard Modification leaflet associated with each modification (published on the website) must be followed and an [LAA/MOD1](#) form completed and return to LAA Engineering in each case (see also [TL 3.06](#)).

<i>Standard Mod no.</i>	<i>Issue</i>	<i>Description</i>
11121	1	Replacement undercarriage assembly
11337	1	Cook replacement undercarriage assembly
11419	1	Elevator flutter damper
11802	1	Crosbie wing folding system
13312	1	Jedi fuel tanks

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Please report any errors or omissions to LAA Engineering: engineering@laa.uk.com