CIVIL AVIATION AUTHORITY – SAFETY REGULATION GROUP
MICROLIGHT TYPE APPROVAL DATA SHEET (TADS)

NO: BM 55 ISSUE: 6

TYPE:		Shadow Series D & DD
(1)	MANUFACTURER	CFM Aircraft Ltd (ceased trading) BMAA is responsible for continued airworthiness
(2)	UK IMPORTER	None
(3)	CERTIFICATION	BCAR Section S (First example Issue 1 dated April 1995)
(4)	DEFINITION OF BASIC STANDARD	CFM Drawing No. see AAN 26063 CFM Shadow D & DD Construction Manual C/RM - DD

(5) COMPLIANCE WITH THE MICROLIGHT DEFINITION:

(A)	MTOW	386 kg
(B)	No. Seats	2
(C)	Maximum Wing Loading	25 kg/m^2
(D)	Vso	35 kt IAS
(E)	Permitted range of pilot weights	55 – 90 kg front seat 0 – 90 kg rear seat
(F)	Typical Empty Weight (ZFW)	190 kg
(G)	ZFW + 172 kg crew + 1 hr fuel	377 kg (21 litres / 15 kg)
(H)	ZFW + 86 kg pilot + full fuel	319 kg (60.2 litres / 43.3 kg)
(I)	Max ZFW at initial permit issue	199 kg

(6) POWER PLANTS

Designation	*Shadow Series D & DD*	*Shadow Series D & DD*	*Shadow Series D & DD*	
Engine Type	*Rotax 582 UL*	*Rotax 582 UL*	*Rotax 582 UL*	
Reduction Gear	*2.58:1 or 2.24:1*	*2.58:1*	*2.58:1*	
Exhaust System	*Rotax side-mount*	*Rotax side-mount*	*Rotax side-mount*	
Intake System	*K&N Air filters*	*K&N Air filters*	*K&N Air filters*	
Propeller Type	*Precisions Props Ground Adjustable (3 blade)*	*Arplast 3 blade DAM 4875/3*	*Arplast 4 blade DAM 4875/4*	
Propeller Dia x Pitch	*52” x 55”*	*52” x 52”*	*52” x 50”*	
Noise Type Cert No.	*123M issue 5*	*123M issue 5*	*123M issue 5*	
AAN approving configuration	*26063*	*26063*	*26063*	

(7) MANDATORY LIMITATIONS:

(A) Max Take-Off Weight — 386 kg

(B) CG Limits — Aft limit 46.1” aft of datum; Forward Limit 40.5” aft of datum

(C) CG datum — 24” fwd of Wing Leading Edge at Wing Root

(D) Cockpit Loadings

	Front	Rear	Total
Min	55 kg	0 kg	55 kg
Max	90 kg	90 kg	180 kg

(E) Never Exceed Speed, V_{NE} — 108 kt IAS

(F) Manoeuvring Speed, V_A — 70 kt IAS

(G) Flap Limiting Speed, V_F — 15° deflection 61 kt IAS; 30° deflection 59 kt IAS

(H) Permitted Manoeuvres — Maximum bank angle 60°; Normal acceleration limits, +4 / -2g; Aerobatics and Spinning prohibited

(I) Fuel Contents (Max Useable) — 33.3 litres; 60.2 litres if slipper tank fitted

(J) Power Plant

Engine	*Rotax 582 UL*			
Max RPM	*6500*			
Max Continuous RPM	*6000*			
Max CHT	*150°C (300°F)*			
Max EGT	*650°C (1200°F)*			
Coolant Temperature	*80℃ (176°F)*			
Fuel Spec	*95 RON minimum unleaded to BS(EN)228, or AVGAS 100LL*			
Engine Oil Specification	*2 Stroke*			
Gearbox Oil Specification	*API-GL5/GL6 SAE 140 EP 85W-140 EP*			
Fuel/Oil Mix	*50:1*			
Fuel Pressure	*0.2-0.4 bar at cruise power*			

(8) INSTRUMENTS REQUIRED

ASI	Altimeter	RPM	CHT / EGT	Compass	Coolant temp	Fuel Gauge	VSI	Slip ball
Required	Required	Required	Required	Required	Required	Required	Optional	Optional

(9) CONTROL DEFLECTIONS

Elevator	UP:	20° ± 2°	Elevator trim tab UP:	22° *
Elevator	DOWN:	16° ± 2°	Elevator trim tab DOWN:	22° *
AileronsUP:		20° ± 2°	Flaps ZERO: In line with wing centre section.	0°
AileronsDOWN:		10° ± 2°		
Rudder LEFT:		25° ± 2°	Flaps INTERMEDIATE:	15° ± 3°
Rudder RIGHT:		25° ± 2°	Flaps LANDING:	30° ± 3°

* The elevator trim tab deflections are shown for guidance. In practice some variation is to be expected.

(10) PILOT'S NOTES, MAINTENANCE MANUALS, PLACARDS

10.1 Manuals approved for use with this aircraft:

Shadow Series D & DD Pilots Notes PN – SH/D
Shadow Series C & CD Service Manual SM – SH/C at Amendment 4
Shadow Series D & DD Construction Manual C/RM – DD

10.2 See Annex D for details of the placards that are to be fitted.

(11) SERVICE BULLETINS, MANDATORY MODIFICATIONS

See Annex A for details.

NOTE: MPDs may be downloaded from the CAA Website:
http://www.caa.co.uk/docs/33/cap661.pdf

(12) MINIMUM PERFORMANCE AT MAX TAKE-OFF WEIGHT

Rate of Climb: 850 ft/min at 60 kt IAS
Stall or Minimum Flying Speed: 35 kt IAS in landing configuration

ISSUE HISTORY

Issue No.		Reason and Signatory
1	24/02/98	Initial issue R J Hardy
2	02/03/98	Editorial changes R J Hardy
3	16/02/99	Corrections to CG limits R J Hardy
4	06/12/02	To include weighing information, editorial changes and the inclusion of MPD 2003-005 R1 and BMAA SB 1682 Issue 1. J Barratt
5	05/07/04	Change to the organisation responsible for continued airworthiness support and additional MPDs J Barratt
6	01/08/11	Removal of MPD 2004-002, superseded by MPD 2004-007R1. Inclusion of all applicable MPDs, SBs and Approved Optional Mods. Placard updates. Correction of climb rate. General data update, improved layout and 3-view drawing. A C Love

ILLUSTRATION OF AIRCRAFT

ANNEX A
SERVICE BULLETINS AND MANDATORY MODIFICATIONS

Designation	Classification	Subject
CFM SB 7	Recommended	Solar heating of upper wing surfaces coloured other than white
CFM SB 8	Optional	Alloy wheels
CFM SB 11	Recommended	Multi-strand elevator cable
CFM SB 12 & MPD 1998-013 R2	Mandatory	Replace/modify the rudder fin post
CFM SB 13	Recommended	Rudder pedal hinges
CFM SB 14 Issue 2 & MPD 2001-002 R2	Mandatory	Cracking of tailplane spar leading edge spigot tubes
MPD 2002-004 R1	Mandatory	Propeller hub mounting bolts
BMAA SB 1682 & MPD 2003-005 R1	Mandatory	Installation of ASI and altimeter correction placards
MPD 2004-007 R1	Mandatory	Main undercarriage replacement with approved alternative. Implement in accordance with MAAN 1762 Issue 2 or MAAN 1773 Issue 1
MPD 2004-008 R1	Mandatory	Nosewheel undercarriage. Inspect in accordance with MAAN 1762 Issue 2 Appendix A, or MAAN 1773 Issue 1 Appendix A
BMAA SB 1877/2 & MPD 2005-002	Mandatory	Elevator Flutter
BMAA SB 2073	Recommended	Inspection of Part F153 Hanger Tube Bracket
BMAA SB 2329	Essential	Horizontal Tailplane Spar and Bush Wear
BMAA SB 2336	Essential	Fuel Tank Deterioration

ANNEX B
APPROVED OPTIONAL MODIFICATIONS

The installation of all optional modifications is to be inspected by a BMAA inspector and an entry made in the appropriate logbook(s). Involvement of the BMAA Technical Office is not required. Note that other approved modifications may exist which are not mentioned here. Contact the BMAA for details.

Mod No.	Subject
CFM 20 / AAN 21682	27 litre fuel tank in place of the rear occupant
CFM 28 / AAN 23713	Modification to allow aircraft to be flown without foot controls
CFM 28a / AAN 23713	Mechanically operated brakes replace pneumatic
CFM 29 / AAN 27392 / MAAN 1193 Issue 5	Slipper tank
CFM 31 / AAN 25545	Multi-strand elevator cable
CFM 32 / AAN 25545	Additional fuselage (shroud) window
MAAN 1762 Issue 2	Crosbie replacement undercarriage and introduction of new max continuous engine rpm (installation of this modification fulfils the requirements of MPD2004-007R1)
MAAN 1773 Issue 1	Cook replacement undercarriage and introduction of new max continuous engine rpm (installation of this modification fulfils the requirements of MPD2004-007R1)

ANNEX C
WEIGHING INFORMATION

CG Datum:	24” Fwd of Wing L/E at Wing Root
Weighing attitude:	Weigh at main wheels and tailskid with boom level
Mainwheel moment arm:	46.75” aft of datum
Skid moment arm:	165.75” aft of datum
Main tank moment arm:	63.5” aft of datum, capacity 33.3 litres (24.0 kg)
Slipper tank moment arm:	42” aft of datum, capacity 26.9 litres (19.4 kg)
Pilot moment arm:	7.75” aft of datum for pilots below 75 kg 9.75” aft of datum for pilots above 75 kg
Passenger moment arm:	42” aft of datum
Crew weights:	Front seat: minimum 55 kg / maximum 90 kg Rear seat: minimum 0 kg / maximum 90 kg
Aft CG Limit:	46.1” aft of datum
Fwd CG Limit:	40.5” aft of datum

ANNEX D
EXAMPLE PLACARDS

(A) FLIGHT LIMITATIONS PLACARD AND MARKINGS

To be displayed next to the ASI.

V_{NE} (Never exceed speed):	124 mph or 108 knots IAS	(to match ASI units)
V_A (Manoeuvring speed):	80 mph or 70 knots IAS	(to match ASI units)

Alternatively the ASI may be marked with: A red radial line at V_{NE}
An amber radial line at V_A
A white arc from V_{S0} to V_{FE}

(B) ASI CORRECTION PLACARD

To be displayed next to the ASI:

Kt IAS (ASI units)	30	35 (V_{S0})	40 (V_{S1})	50	60 climb	70 (V_A)	80	90	100	108 (V_{NE})
Kt CAS	26	30	35	44	52	60	69	77	84	90

(C) ALTIMETER CORRECTION PLACARD

To be displayed next to the Altimeter:

Kt IAS (ASI units)	30	40	50	60	70	80	90	100	108
Altimeter over-read (feet)	10	15	25	40	55	75	100	125	150

(D) LOADING PLACARD

The placard is to be visible to the pilot:

EMPTY WEIGHT:	Enter weight from current weight report
MAX TAKE–OFF WEIGHT:	386 kg
MINIMUM COCKPIT LOAD:	55 kg in front seat
MAXIMUM COCKPIT LOAD:	90 kg in each seat (may be reduced to 86 kg pilot to satisfy cg limit)

(E) ENGINE LIMITATIONS PLACARDS AND MARKINGS

To be displayed next to the engine instruments, and/or the instruments to be marked as detailed below:

MAX RPM:	6500	and/or a red radial line
MAX CONT RPM:	6000	and/or an amber sector between MAX CONT and MAX RPM
MAX EGT:	650°C or 1200°F	(to match units of instrument) and/or a red radial line
MAX CHT:	150°C or 300°F	(to match units of instrument) and/or a red radial line
MAX COOLANT:	80°C or 176°F	(to match units of instrument) and/or a red radial line

(F) FUEL LIMITATIONS PLACARD

This must be based on the most recent weight report for the aircraft and displayed near to the filler cap. The examples below are for an empty weight of 199 kg. Adjust accordingly using empty weight from current weight report.

With Slipper Tank

FUEL Capacity 60.2 Litres 2-stroke mix 50:1	
Cockpit Weight (kg)	Max. Fuel Load (litres)
180	9
175	16
170	23
165	30
160	37
155	44
150	51
145	58
143	FULL
95 RON minimum unleaded to BS(EN)228 or AVGAS 100LL	

Without Slipper Tank

FUEL Capacity 22.7 Litres 2-stroke mix 50:1	
Cockpit Weight (kg)	Max. Fuel Load (litres)
180	9
175	16
170	FULL
95 RON minimum unleaded to BS(EN)228 or AVGAS 100LL	

(G) SWITCHES

All switches are to be marked with function and sense (up=on, down=off).

(H) MISCELLANEOUS

Fireproof metal plate showing the aircraft registration to be mounted in a prominent position.

The additional limitations, warnings, and secondary controls and switches are to be placarded as below.

Front Cockpit

AEROBATICS AND SPINNING ARE PROHIBITED

TRIM:	NOSE UP NOSE DOWN			
THROTTLE:	INCREASE DECREASE			
CHOKE:	ON OFF			
EMERGENCY FUEL CUT OFF:	UP FOR OFF			
IGNITION:	ON OFF			
FLAPS:	0°			
	15°	$V_{F1:}$	70 mph or 61 knots IAS	(to match ASI units)
	30°	$V_{F0:}$	68 mph or 59 knots IAS	(to match ASI units)

Rear Cockpit

MAXIMUM SEAT LOAD: 90 kg

DO NOT GET OUT WHEN ENGINE IS RUNNING

DD only: *DO NOT ATTEMPT TO FLY THE AIRCRAFT SOLO FROM THE REAR SEAT*

THROTTLE: *INCREASE*
DECREASE