LAA TYPE ACCEPTANCE DATA SHEET
TADS 062
EVANS VP-1 AND VP-1 SERIES 2

Issue 5	New format. Change to US contact details. Addition of optional mod to section 3.2. Addition of plans change VP-W-12A to section 3.3	Dated 4/2/16	JV

These TADS are 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

None.

US contact: Evans Aircraft, PO Box 231762, Encinitas, California 92023
Website: www.evansair.com

1.2 Description

The VP-1 is a long-accepted plans-built aircraft design, drawings only available. Traditional all-wood construction, fabric covered and strut-braced the VP-1 is designed for simplicity of construction above all else. Aircraft are typically fitted with VW engines.

Despite its small size and light weight, all VP-1 s are SEP Aeroplanes, not microlights.

When fitted with the optional 800 lbs gross weight modification, the aircraft becomes known as an Evans VP-1 Series 2.

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

Not applicable: plans-built.

2.2 Build Manual

Nil. Construction drawing set provides all required information, consisting of the following:

Sheet	Page		Sheet	Page	
V-1	1	3 View	I-1	2	Inboard Profile
F-1	3&4	Fuselage Assembly	F-3	5	Fwd Spar Bhd
F-4	6	Aft Spar Bhd	F-5	7	Fwd Spar Root Ftg
F-6	8	Aft Spar Root Ftg	F-7	9	Firewall Assembly
F-8	10	Stern Post Assembly	F-9	11	Fuselage Details
F-11	12	Cockpit Gusset Installation	F-15	15	Rudder Installation
F-17	16	Fuel Tank Deck	F-18	17	Fuel Tank Assembly
F-19	18	Windshield & Roll Bar	C-1	19	Control Schematic
C-2	20	Control Stick	C-3	21	Rudder Pedal Installation
C-4	22	Stab. Pulley Installation	C-6	23	Fairlead Installation
C-7	24	Aileron Horn Installation	C-8	25	Aileron Pulley Installation
S-1	26	Stabilator Assembly	S-2	27	Stabilator Rib
S-3	28	Stabilator Spar Assembly	S-4	29	Stabilator Balance Installation
S-5	30	Stabilator Tab Assembly	S-6	31	Stabilator Installation
G-1	32	Landing Gear Assembly	G-2	33	Landing Gear
G-3	34	Landing Gear Installation	G-4	35	Tail Skid
W-1	36	Wing Assembly	W-1.1	37	Airfoil Layout & Tow Config
W-2	38	Front Spar assembly	W-3	39	Aft Spar Assembly
W-4	40	Compression Strut Installation	W-5	41	Rib/Fwd Spar Installation
W-6	42	Rib/Aft Spar Installation	W-7	43	Root Rib/Fwd Spar installation
W-8	44	Root Rib/Aft Spar Installation	W-9	45	Wing Rib details
W-10	46	Geometry – Flying Struts	W-11	47	Flying Strut End – Lower
W-12	48	Flying Strut End – Lower	A-1	49	Aileron Assembly
A-2	50	Aileron Balance Installation	R-1	51	Rudder Assembly
R-2	52	Rudder Rib Sections	R-3	53	Rudder Tab Installation
E-1	54	Engine Cowl & Firewall Installation	E-2	55	Engine Controls – Cockpit
J-1	56	¼ Plywood Layout	J-2	57	Fuselage Jig Table
J-3	58	Aft Fairing	P-1	59 &60	Airspeed Pitot Static installation
B-2	61	Bushings & Covers			

2.3 Build Inspections

Build inspection schedule 1 (wooden aircraft).
Inspector approval codes A-A or A-W. Inspector signing off final inspection also requires 'first flight' endorsement.

2.4 Flight Manual

Nil available, but see LAA Booklet *'Enjoy The Sky'* (£1.50 inc p & p) which contains a comprehensive flight test report, or if you can get it, Bill Beattie's book 'Flying the Evans VP' (previously available from the designer Bud Evans).

2.5 Mandatory Permit Directives

None specifically applicable to this aircraft type.

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)

Modifications required by the LAA for acceptance of the type in the UK, are as follows:

- Inclusion of wing strut jury struts on front struts only, shown on all but the earliest VP-1 drawing sets
- Dual ignition VW engine

Note also LAA provide a list of UK equivalent materials for constructing the VP-1.

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

(Refer to the engine manufacturer's latest documentation for the definitive parameter values.)

With VW: Maximum CHT: 225°C
Maximum EGT: 800°C
Maximum oil temperature: 90°C
Minimum oil pressure: 2.5 kg/cm² @ 3000 rpm

2.8 Control surface deflections

TBD.

2.9 Operating Limitations and Placards

(Note that the wording on an individual aircraft's Operating Limitations document takes precedence, if different.)

1. Maximum number of occupants authorised to be carried: One

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
   Aerobatic manoeuvres are prohibited.

Intentional spinning is prohibited.

2.2 Loading Limitations
Maximum Total Weight Authorised: 750 lbs (800 lbs with mod LAA/VP-1/1000 and 1834cc engine)
CG Range: 7.5 inches to 15.5 inches aft of datum
Datum Point is: leading edge of the wing

2.3 Engine Limitations
Maximum Engine RPM: 3000

2.4 Airspeed Limitations
Maximum Indicated Airspeed (V_{NE}): 115 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.

2.10 Maximum permitted empty weight

Fuel tank contents may vary slightly between examples so it is not possible to define a universal maximum empty weight. With full fuel tank, aircraft must be able to carry a pilot weighing 170 lbs without exceeding max permitted gross weight.

Section 3 – Advice to owners, operators and inspectors

3.1 Maintenance Manual

Nil. In the absence of a manufacturer's schedule, refer to LAMS schedule.

3.2 Standard Options

- 1600 or 1834cc VW engine
- LAA/VP-1/1000 (mods required to increase MTWA to 800 lbs and being designated a VP-1 series 2)
- Evans improvements ("VP-2 prototype mods") 2, 3 and 4

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.

Ref	*Description*
Service bulletin #1	Tail spring attachment reinforcement
Service bulletin #2	Main undercarriage attachment reinforcement
Safety bulletin #1	Rudder pedal hinge cracking
VP-W-12-A	Plans change: addition of jury struts to forward wing struts

3.4 Special Inspection Points

- With VW engine, design of conversion to be agreed with LAA Engineering as there is no standard design of VW conversion. 'Peacock' VW conversion drawings are available from LAA Engineering, but these drawings are now many years old and not all parts called up are still available. Dual ignition system (of an accepted type) required. LAA VW Engine Build checklist to be completed during build up of engine to record critical measurements. Refer to SPARS section on VW engines. With 1834 conversion, oil cooler will almost certainly be required, and careful ducting to achieve adequate cylinder cooling. Compression ratio must be set up (usually no more than 8.0:1) using choice of cylinder base shims if required. With 1834cc conversions, failing to use base shims usually results in excessively high compression ratio and consequent excessively short engine life.
- With VW engine, quality of fit of propeller hub on crankshaft nose is critical to security of propeller mounting in flight.
- With VW conversion, if gravity feed is used, check gravity flow from downstream side of carburettor float valve (by removing float chamber bowl or float chamber drain plug) rather than at carburettor fuel inlet. If an automotive carburettor (e.g. Stromberg CD150) is used with gravity feed, the carburettor float valve is often found to provide inadequate or very marginal flow. This is because automotive carburettors are set up for use with a pump-fed installation not gravity feed. The fuel pressure from a pump allows a carb float jet of only about 1.5 mm diameter to be used, this restricts the flow too much with the much lesser fuel pressure in a typical gravity fed system. This is a common cause of lean running and engine failure. This is cured by fitting a larger diameter jet to the float valve, (typically 2.5 to 3mm diameter) or carefully opening up the existing jet and lapping it in with a household brass polish
- The VP-1 has heavy aileron controls and it is important to fit the aileron gap seals to avoid this being exaggerated. Care is required with the rigging of the controls due to the proximity of the control cables where they are routed together at the base of the control column and it is important to check that the cables are not rubbing or twisted in this area. Due to the design of the control system there is a more than usual amount of springiness in the controls which is unavoidable.
- The single-ignition engine conversion details shown on the drawings do not meet UK requirements, see Peacock VW conversion drawings for details of dual-ignition conversion.
- Note the VP-1 was designed as very simple lightweight open-cockpit aircraft. Fitting additional 'options' will result in the aircraft turning out overweight and spoiling what is at best only very moderate flight performance.
- Mahogany marine plywood (often referred to as gaboon ply) is used widely in the construction of the aircraft. All marine ply must be carefully inspected for defects, voids, knots etc, before use.
- Care is required in bending the aluminium alloy main undercarriage legs to get the bends in the correct positions, otherwise the undercarriage geometry can be adversely affected and the undercarriage will collapse at below the design load.

Properly made, the undercarriage is perfectly satisfactory and there is no need to replace the cross-bracing tie-rods by rigid tubes.

- Maintenance is typical of wooden/fabric airframe, see CAA CAP 562 CAAIP leaflets 51-10 and 51-20 in particular for older examples, especially if the aircraft has not been hangared. Due to the crude method of hinging the all-moving tailplane using eyebolts, it is very difficult to avoid play in the bearings and this can give the impression that the tailplane is loose. This can sometimes be partially corrected by shims.
- Due to the way that the plywood tailplane and aileron mass balance arms project outside the flying surfaces, they are vulnerable to being 'tripped over' and should be inspected carefully for signs of cracking or breakage.
- The rectangular slot in the rear bulkhead which the tailwheel spring passes through frequently wears in service, allowing the spring to work loose. An Evans repair scheme exists for this problem (Evans improvement # 4 - details from LAA).
- The piano hinges used for hinging the rudder pedals of the VP-1 are vulnerable to cracking.
- In the case of a heavy landing, apart from checking for obvious undercarriage distortion the undercarriage attachments should be inspected carefully for bruising of the fuselage lower longerons locally, and the wing mainspars checked for signs of cracking/compression shakes in the region just outboard of the strut attachments. Any damage in these areas is likely to seriously reduce the strength of the wing and the aircraft must be grounded pending major repair. Cases have also been reported of the engine mounting studs cracking in the threaded portion which screws into the crankcase.
- 'Nylite' nylon wheel hubs, if fitted, to be checked carefully for signs of overstress/failure of hub.
- Adequate payload. Watch out for aircraft being overweight.
- Control cable tensions. We are not aware of any approved range of control cable tensions for the VP-1. In the UK, for amateur built aircraft, acceptable cable tensions are usually determined by the amateur builder's LAA inspector, based on good judgement and the mechanical characteristics of the particular system concerned. In the case of the VP-1 the cables cannot be very taught because if you tighten them too much the system gets too much friction in it and the pulley mountings flex. The cables should be simply tightened up until the amount of 'give' in the system feels right.
- Due to the design of the aileron control system, with one aileron held in line with the wing it is normal to be able to deflect the other aileron by 50mm or so up and down at its trailing edge under gentle hand pressure - much more so than you'd expect with other types of aircraft. This flexibility in the control system is due to the aileron pulley mountings flexing and the very wide chord of the ailerons, which exaggerates the movements.

3.5 Special Test Flying Issues

- Achieving satisfactory engine cooling
- Achieving satisfactory climb performance: 250 fpm is the minimum acceptable

Apart from poor climb performance in some cases, the Evans VP-1 are simple aeroplanes to fly for anyone accustomed to tailwheels and co-ordinated use of rudder with old-fashioned ailerons, and have a good safety record. The view from the wide open cockpit takes a little getting used to. The ailerons are heavy and not very effective, requiring plenty of rudder to balance the turn. Failure to raise the tail properly on take-off will result in an extended take-off run and shallow wallowing

climb-out. There is a tendency to over-rotate on landing and consequently to touchdown tailwheel first.

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