**LAA TYPE ACCEPTANCE DATA SHEET**
**TADS 303**
**VANS RV-8 & 8A**

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| Issue 16 | Addition of Vans SB | Dated 25/07/18 | JV |

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

There is no UK agent. Contact Vans direct: Van's Aircraft Inc, 14401 NE Keil Road, Aurora, Oregon, 97002, USA
Tel: 001 (503) 6786545
Website: www.vansaircraft.com

UK Vans owners club – 'RV Squadron': www.rvuk.co.uk or email rvsqn-owner@yahoogroups.com

### 1.2 Description

The Vans RV-8 is a single-engine, two-seat, tandem monoplane design of all metal construction, originating from the USA. This is a popular and successful design, developed from the Vans RV4 and RV6 which have been built in large numbers in the UK.

The aircraft is a low-wing monoplane of conventional layout. The fuselage is of conventional all-metal construction with sheet aluminium skins. The design methodology borrows heavily from the already PFA type accepted Vans RV-3, -4, -6 designs. A one-piece canopy is fitted, rearward sliding, allowing straightforward access to the tandem seating arrangement. The aircraft is flown solo from the front seat. Dual controls are fitted.

The RV-8 can be built from standard or fast-build kit. Pre-built wing spars are also available. All are acceptable subject to the inspector being entirely satisfied with the quality of workmanship of any part-built assemblies. Solid-riveted sheet aluminium construction is used throughout. Many hundreds of these kits have been sold. The aircraft is fitted with integral wing fuel tanks and sealed during construction using a proprietary sealant. For UK-built examples recommend suitable corrosion protection of aluminium airframe throughout, e.g. epoxy primer on aluminium parts and assembly compound where steel parts are assembled to aluminium parts.

The RV-8A is similar to the RV-8 except that the RV-8A has a nosewheel rather than tailwheel undercarriage.

Later aircraft fitted with the stronger -1 version of the wing kit are eligible to operate at 1600 lbs maximum aerobatic weight rather than 1550 lbs. According to Vans, the '-1' version wings were supplied with all kits shipped from the start of 2001 and can be identified from the kit packing list where '-1' is appended to the part number for the wing kit.

160-200 BHP Lycoming O-320, IO-320, O-360 or IO-360 engines may be fitted as recommended by Vans. Also accepted with equivalent 'XP' type engines manufactured by Superior Air Parts. Consult LAA technical leaflet TL 3.15 for acceptable choices of clone engines. In general, a modification application is required for electronic ignition installations on Lycoming/clone engines.

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.

## 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 contents of the standard fast build kit is accepted as compliant with the 51% 'major portion' requirements on the basis that it is the same kit standard that has been accepted as 51% compliant by the FAA.

### 2.2 Build Manual

RV-8/-8A Assembly Manual and RV-8/-8A drawings. Vans's newsletter, the RVator, provides useful additional guidance. A useful compilation of the content of past 'RVators' is also available from Vans.

### 2.3 Build Inspections

Build inspection schedule 44 (Vans RV Aircraft).
Inspector approval codes A-A, A-M, or K. Inspector signing off final inspection also requires 'first flight' endorsement.

### 2.4 Flight Manual

Nil. Build manual contains section with advice on flight testing.

2.5 Mandatory Permit Directives

None applicable specifically 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)

| *Reference* | *Description* | *Applicability* |
|---|---|---|
| MOD/303/001 | Inspection for cracking in tailplane front spar | All variants |
| MOD/303/002 | Inspection for cracks in elevator forward spar | All variants |

Note LAA advisory letter regarding water leakage past fuel filler caps dated 3.9.02

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

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

2.8 Control surface deflections

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|---|---|
| *Ailerons* | *Up: 25 to 32°*<br>*Down: 15 to 17°* |
| *Elevators* | *Up: 25 to 30°*<br>*Down: 20 to 25°* |
| *Rudder* | *Left 30 to 35°*<br>*Right 30 to 35°* |
| *Flap* | *Down 40°* |

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: Two

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: 1800 lb
CG Range: 78.7" to 86.82" aft of datum
Datum Point is: a point 70.0" forward of the leading edge of the wing

2.3 Engine Limitations
Maximum Engine RPM: 2700 (2600 rpm when Sensenich 70CM 2-blade metal propeller fitted to O-320 or IO-320 engines)

2.4 Airspeed Limitations
Maximum Indicated Airspeed ($V_{NE}$): 230 mph IAS
Max Indicated Airspeed Flaps Extended: 110/100 mph IAS

2.5 Other Limitations
The aircraft shall be flown by day and under Visual Flight Rules only.
Smoking in the aircraft is prohibited.
Solo from front seat only.

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.

a. In addition, when certain types of propeller are fitted to the RV-8 , RPM 'avoid bands' are necessary as specified by the propeller manufacturer, in which case these must also be placarded.
b. In addition, when Hartzell blended airfoil HC-C2Y or –C2YR propeller is used with 360 engines and FADEC or LASAR ignition, extra engine rpm and manifold pressure limitations apply (ref Service letter dated 3.03)
c. In addition, when a three blade constant speed propeller is fitted, 'minimum indicated airspeed for power-off approach, 80 mph IAS' (due to braking effect when discing).

Aerobatic approval is subject to individual assessment and flight tests including spin testing. For those aircraft cleared for aerobatics and spinning, the following alternative/additional operating limitations and placard requirements apply:

<u>Aerobatic Limitations</u>

Intentional spinning is permitted not exceeding two turns.
The following aerobatic manoeuvres only are permitted, not exceeding +6g or -3g
Maximum airspeed for full control deflection, VA = 142 mph IAS

| *Manoeuvre* | *Entry air speed* |
|---|---|
| Inside loop | 150 mph |
| Aileron/slow/barrel roll | 135 mph |
| Stall turn | 140 mph |
| Roll off the top | 160 mph |
| Cuban eight | 160 mph |

Loading Limitations
Maximum aerobatic weight: 703 kg (1550 lb) (1600 lb if '-1' wing fitted)

CG Range for aerobatic and spinning: 78.7" to 85.3" aft of datum.

Aircraft cockpit to be placarded: "Warning: this is a high performance aircraft in which care is required particularly during aerobatic manoeuvres to avoid exceeding structural limits and/or maximum permitted airspeeds".

2.10 Maximum permitted empty weight

N/A

## Section 3 – Advice to owners, operators and inspectors

3.1 Maintenance Manual

Nil. In the absence of a manufacturer's schedule, LAMS can be used as a guide to required inspections and this is reflected in the check list in Section 1 of the LAA's Permit renewal application form. Alternatively the LAA Generic Maintenance Schedule may be used.

Vans service information should also be reviewed. Maintenance is typical of riveted aluminium alloy airframe. Engine maintenance as appropriate to the engine manufacturer's advice (e.g. Lycoming).

3.2 Standard Options

Vans offer a great number of options in their catalogue of accessories, the majority of which are accepted by the LAA. Refer to LAA technical leaflet TL3.08 for details.

In general, it is possible to convert an RV-8 to an RV-8A and vice versa. Contact LAA Engineering for advice prior to starting a conversion.

The following items are also permitted to be fitted as optional equipment, without further reference to LAA Engineering. Installations must be inspected by an LAA Inspector against the supplied installation instructions and a PMR entered into the logbook.

- Andair lockable fuel caps.
- Andair fuel pump PX375-TC (on fuel injected engines only and only pump serial numbers 30453 and on).
- Briggs Airmotive nosewheel bearing spacers (ref LAA mod 12265).
- 'Bell' tailwheel fork (ref LAA mod 12276).
- Sega tailwheel fork (ref LAA mod 12414).
- Rocket tailwheel steering link (ref LAA mod 11575).
- Grove Aircraft Landing Gear Systems Inc, RV-8 Standard Lightweight Gear p/n1220-1.
- Grove Aircraft Landing Gear Systems Inc, RV-8 Airfoiled Lightweight Gear p/n1219-1.
- JD Air Parts Tailwheel Fork Assembly.
- JD Air Parts Lightweight Tailwheel.
- JD Air Parts Tailwheel Steering Link.
- Dynon pitot head on a Gretz mount (ref LAA mod 12540).
- Dynon pitot head on a Safeair1 mount (ref LAA mod 13866).

- Bonding of canopy (ref LAA mod 12801, see instructions).
- Delrin aileron stop (ref LAA mod 12593).

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. Copies of service information can be downloaded from Vans' Website.

Service Letters:

| *Dated* | *Description* |
|---|---|
| 23.12.15 | RV – Aerobatic gross weight |
| 11.12.14 | VS-801PP vertical stabiliser skins |
| 24.10.14 | Heat muff screen installation |
| 3.7.14 | SAIB HQ-14-16 all-metal lock nuts |
| 20.12.11 | Fuel valve lever II installation |
| 19.4.11 | A letter to prospective buyers of flying RVs |
| 26.11.07 | Soft rivets |
| 16.11.07 | Inspect master switch |
| 9.11.07 | Nose gear leg and fork upgrade |
| 6.9.07 | Tricycle gear aircraft nose wheel torque |
| 5.4.07 | Dynafocal II mounts |
| 18.10.06 | #2 Battery cables |
| 13.2.06 | 60 amp alternator |
| 10.05 | Filtered Airbox advisory |
| 10.03.05 | Nose gear design |
| 11.8.04 | Buying a second hand RV kit |
| 30.6.04 | Buying a flying RV |
| 4.9.03 | GAS-3 gascolator recall |
| 3.03 | Hartzell HC-C2YR prop |
| 3.03 | Hartzell HC-C2YK prop |
| 14.11.01 | CT 82Fand CT 83F |
| 12.6.00 | Fuel pickup tube anti-rotation bracket |
| 19.5.00 | Letter to QuickBuilders |

Service Bulletins:

| *Reference* | *Description* |
|---|---|
| SB 18-05-21 | Proper installation of gauge plug in fuel spider |
| SB 16-12-16 | Missing centre section bolts (Note that although the applicability is to quick-build kits, at least one non-quick-build kit has been found in the UK with missing bolts, therefore all aircraft should be checked) (See also LAA/AWA/17/01) |
| SB 16-03-28 | Cracking of wing aft spar web at the inboard aileron hinge bracket attach rivets |
| SB 14-12-22 | Nose stop flange installation |
| SB 14-2-5 | Cracks in elevator spar (see MOD/303/002) |
| SB 14-1-31 | Horizontal stabiliser cracks (see MOD/303/001) |
| SB 12-8-14 | Inspect for missing wing attach bolts |
| SB 11-9-13 | Fuel tank slosh inspection |
| SB 07-11-09 | Nose gear leg and fork upgrade |

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| SB 07-4-12 | Securing flap motor rod end bearing |
| SB 07-2-6 | Affixing the passenger control stick permanently |
| SB 06-9-20 | Trim cable anchor |
| SB 06-2-23 | Safetying of standard and flop-type fuel pickup tubes (see also related LAA letter) |
| SB 04-3-1 | Electric flap motor recall |
| SB 02-12-1 | Pre-manufactured hoses |
| SB 96-10-2 | Full swivel tail wheel |
| SB 96-10-1 | Filtered airbox |

## 3.4 Special Inspection Points

- Builders not familiar with the form of solid construction used in this type are encouraged to practise on scrap test pieces to learn techniques of riveting before starting on actual construction.
- These are high-performance aircraft and top quality workmanship is essential.
- The engine compartments of these aircraft are fairly cramped and care should be taken to avoid overheating problems, charring of the cowlings near the exhaust, vapour-lock due to pre-heating of fuel in gascolator, etc. Insulating the exhaust pipes has been found to help, but can cause problems with premature and hidden corrosion of the exhaust pipes underneath.
- The flaps are operated by rod-ends on the operating pushrods without any back-up capturing feature and therefore the rod-ends must be checked carefully for wear to ensure that there is no possibility of a rod-end coming adrift from a flap.
- Check that fuselage fairing around rear of tailplane is well secured since if this fairing comes loose it could cause the elevator to jam.
- Take care to minimise operating friction in flying controls by careful attention to hinges, rod-ends, lubrication etc.
- Note that the trailing edge profile on control surfaces is critical to control characteristics.
- If manual elevator trim fitted, refer to SB-06-9-20 regarding problems with rear attachment of trim cable.
- Longitudinal levelling datum for weight is the cockpit rails.
- Cracks have been found on rudder pedal welded assemblies in the vicinity of the plastic mounting bushes.
- Note that fuel tank flop tubes and inverted oil systems are not prerequisites for aerobatic clearance; however, aircraft must be individually cleared for aerobatic operation after an assessment of their equipment and configuration.

## 3.5 Special Test Flying Issues

- VP Prop flight test schedule required if VP prop is fitted.
- Adjustments to lateral trim can be made by lightly dressing aileron trailing edges.
- These are high-performance aircraft but nevertheless the designs are well developed and thanks to good handling characteristics they have achieved a good accident-free record. Care must be taken with the distribution of baggage between the front and rear baggage compartments depending on whether flying solo or with a passenger, otherwise cg range limits can be exceeded.
- The stall warner vane (if fitted) may need adjusting to sound the hooter at the correct airspeed.
- Problems have been experienced with the similar RV-6A noseleg, especially when operating off grass, with instances of the nosewheel bending back and the strut digging into the ground, causing a rapid stop and further damage. In order to avoid

this risk, it is important to maintain the correct nosewheel tyre pressure, and to trim the spat to ensure generous clearance between the tyre and the wheel aperture in the spat (circa half an inch). It is also important to maintain suitable preload on the nosewheel axle bearings, torquing up the axle nut gently as required in the absence of a conventional spacer between the bearings. It is also important to land the aircraft on the mainwheels first and hold the nosewheel off the ground during the initial part of the landing roll, rather than landing on all three wheels together which encourages wheelbarrowing and overloading the nosewheel.

- With a Lycoming O-320 engine as supplied through Vans in a Vans airframe, some owners have found that engines supplied with an IO-5217 carburettor ran too lean, leading to rapid temperature rise and a serious risk of overheating in the climb and unduly high temperatures in the cruise. This may be because the Vans intake ducts are more efficient than normal and allow a greater airflow than in other Lycoming installations. This appears to be a particular serious problem when constant speed propellers are used, allowing the engine to develop full power (and therefore maximum heat) in the climb. In some cases this has meant having to throttle back at about 1000 ft agl after take-off, to avoid exceeding engine temperature limits and risking engine damage. Some owners have resorted to drilling out the carburettor main jet with a #39 drill to cure the problem, but this modification presumably negates the warranty. Marvel-Schebler suggest that their alternative IO-3678-32 carburettor is set up to more rich than the IO-5217, and should be suitable in this application, but some owners report this causing a flat spot between 1300 and 1500 RPM.

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