LAA TYPE ACCEPTANCE DATA SHEET
TADS 152
ARV1 SUPER 2 & ARV-K1 SUPER 2

Issue 1			
Revision A	Initial issue	Dated 30/6/11	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 the LAA considers mandatory and must be complied with.
Section 3 contains advisory information that owners should be aware of to help them maintain their aircraft in an airworthy condition.

Section 1 - Introduction

1.1 UK contact

The type is no longer in production and there is no company currently supporting the type.

An owners' website exists to help UK owners keep in contact:
http://sites.google.com/site/flyarv/

Recognised UK experts on the type:
Mike Thomas, 01243 584959
Andy Pavey, 01983 56886
Nick Sibley, 01292 675685

Hewland engine spares and information:
Chris Challener, 0161 4321263

1.2 Description

The ARV1 Super 2 is a high-wing, two-seat , tricycle undercarriage aircraft certificated in the UK in the late 1980s for factory production, the majority being built at Sandown on the Isle of Wight. A number were also built by amateurs from kits. Following the demise of the original ARV company the type certificate has passed through various hands and a very small number of further aircraft produced. In the absence of an effective TC holder the CAA now consider that the type is no longer eligible for a Certificate of Airworthiness, and by agreement with the CAA all UK registered examples which have been operated on Certificates of Airworthiness have now being transferred to Permits to Fly administered through the LAA.

The type was originally supplied with a Hewland AE75 2-stroke engine with a Hoffman HO 08 160S 145L, HO 08 160 145L or Lodge CJL 118 63" x 55" propeller, although some examples were fitted with a Mid-West AE100R engine. Subsequently, some examples have been refitted with Rotax 912-ULS, Rotax 914-UL or Jabiru 2200A 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.

The ARV-K1 Super 2 refers to the kit-built version of the type supplied by Aviation Scotland Ltd.

All versions of the type are 'group A' types.

Section 2 – Mandatory information for owners, operators and inspectors

2.1 Fast Build Kit 51% Compliance

No longer available as a kit.

2.2 Build Manual

Build manual reference ARV/KM/85 was supplied by ARV. A copy is on file with the LAA.

2.3 Build Inspections

No longer available as a kit.

2.4 Flight Manual

ARV Super 2 Pilot's Operating Handbook & Flight Manual (copies available from Mike Thomas, see section 1.1).

2.5 Mandatory Permit Directives

Applicable specifically to this aircraft type:

1995-001 R5	Aircraft of a type previously issued with a Certificate of Airworthiness but now operating on a UK CAA Permit to Fly.

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)

The following CAA Airworthiness Directives are considered mandatory on all ARV1 Super 2 variants, as applicable:

AD	*Associated document*	*Description*
010-08-86	Maintenance manual	Mandatory fatigue lives.
025-05-87	ARV-SB-002	Hewland AE75C engine – loctiting carb bellmouth screw and wirelocking carb heat box retaining screws.
001-11-87	ARV-SB-008	Hewland AE75C engine – propeller shaft.
015-11-87	ARV-SB-007	Damage to rudder pedals.
007-03-89	ARV-SB-012	Cracks under the bearing sleeve on noseleg downtube.

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 Hewland AE75 engine:
Max Coolant Temp: 107°C (normal operation 60-95°C)
Max EGT: 625°C
Minimum Fuel Pressure: 0.3 psi

2.8 Control surface deflections

Ailerons	Up: 20° ±1° Down: 14° ±1°
Elevators	Up: 25° ±1.5° Down: 20° ±1.5°
Elevator tab	Up: 17° ±2° Down: 17° ±2°
Rudder	Left: 25° ±1° Right: 25° ±1°
Flap	Down: 0° - 25° ±3° - 40° ±3°

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: 499 kg (some examples have been cleared to 525 kg)
CG Range: 2.245 m (88.5 inches) to 2.131 m (91.0 inches) aft of datum
Datum Point is: a point 2.54 m (100.0 inches) forward of the intersection between the cabin rear bulkhead and the canopy sill.

2.3 Engine Limitations
Maximum Engine RPM: 6750 (Hewland AE75 engine)

2.4 Airspeed Limitations
Maximum Indicated Airspeed (V_{NE}): 126 knots
Max Indicated Airspeed Flaps Extended: 80 knots

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

Not applicable.

Section 3 – Advice to owners, operators and inspectors

3.1 Maintenance Manual

ARV Super 2 maintenance manual (copies available from Mike Thomas, see section 1.1).

Hewland maintenance manual (copies available from Chris Challener, see section 1.1).

3.2 Standard Options

None known.

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

The following items are recommended by the LAA but are not mandatory:

MOD/152/001 Inspection of control column aileron torque tube assembly

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	*Date*	*Description*	*Factory compliance status*
ARV-SB-002		Loctiting carb bellmouth screw and wirelocking carb heat box retaining screws (see AD 025-05-87)	Mandatory
ARV-SB-003		Design upgrades (a/c 004-006 & 009 only)	Not known
ARV-SB-004		Design upgrades (a/c 004-006 & 009 only)	Not known
ARV-SB-005		Carburettor needle wear	Not known

ARV-SB-006		Hewland AE75 spark plug maintenance	Not known
ARV-SB-007		Damage to rudder pedals – inspection, repair, replacement (see AD 015-11-87)	Mandatory
ARV-SB-008		Hewland AE75C engine – propeller shaft (see AD 001-11-87)	Mandatory
ARV-SB-009		Installation of AE75 engine	Not known
ARV-SB-010		Revised tacho markings for AE75D	Not known
ARV-SB-011		Fin rudder clearance check	Not known
ARV-SB-012	1/9/88	Cracking in the noseleg downtube	Mandatory
ARV-SB-013	1/9/88	Introduction of mod MV125, noseleg with no life limit	Optional
ARV-KSI-001		Improvements/extra inspections, ARV kit a/c 004-007 & 009	Not known
ARV-KSI-002		Improvements/extra inspections, ARV kit a/c 004-007 & 009	Not known

3.4 Special Inspection Points

- Corrosion of the strut brackets on the wing and on the fuselage has proved troublesome. The material used for these components has excellent fatigue properties, but is poor in corrosion resistance. Should any corrosion approach 10%, then the component should be replaced.
- Corrosion of flap rod ends - This is a common problem that should be rectified. Contact Mike Thomas for the availability of spare parts.
- Lift struts on early aircraft had a life of 1000 hours: these have lightening holes in the end plate fittings (the struts without the lightening holes have a life of 6200 hours).
- The main undercarriage legs are mounted to the fuselage and clamped into plummer blocks with rubber isolation strips. These strips sometimes migrate or split requiring replacement before damage occurs to the plummer blocks.
- The noseleg mounts to a box riveted to the firewall; it is worth a look to ensure all the rivets are tight; some aircraft had solid rivets fitted in place of the pop rivets.
- Check that tyre pressures are kept to the recommended value; being rather small tyres, a small loss of air pressure will affect the performance on take off. A problem can occur with low nosewheel tyre pressure, causing shimmy which in turn can damage the top of the rudder especially if the rudder cables are tensioned below the limit. This area should be closely inspected after such reports. The rudder can be reinforced in this area to combat the problem – consult LAA for information.
- Check the cable operated brakes and the elevator trim system. Ingress of moisture will cause corrosion of the inner and outer parts of the control cables resulting in stiffness of the brake pull handle, also lost motion in the elevator trim system which in turn will affect the ability to trim the aircraft.
- Flaps are operated with a lever which is held in position by indented plates for take-off and landing positions; if wear occurs, the airflow loads on the flaps can cause them to release unexpectedly - check for good engagement.
- Battery Condition - due to the continued running of the Hewland's ignition system relying on a battery being in good condition and properly holding charge, the maintenance manual of the Hewland engined ARV requires a new battery to be installed every three years. Further, it is important that the battery leads are checked and kept in good condition whilst making good contact. The consequences

of a battery or battery lead failure are severe and if the positive lead were to fail and earth out on the aircraft structure this could cause an engine failure.

- Potential Gearbox Bearing Failure - The gearbox oil level should be checked to be above minimum at each pre-flight inspection, and the level further checked every 25 hours. However, LAA is aware of a couple of instances where metal debris has been discovered in the oil drained from the engine reduction gearbox and further inspection revealed that the input shaft bearing housing had failed. Debris may have damaged the input shaft oil seal, leading to a small oil leak. It is therefore recommended that any increase in gearbox oil consumption and any oil leaks be investigated thoroughly.
- Water Pump Drive Belt Failure - In 1995 a PFA ARV was damaged in a forced landing when the bearings of the water pump failed, probably due to an incorrect installation of the pulley which had apparently never been properly positioned fully onto the shaft from new. The consequent misalignment of a newly installed belt led to early failure of the pump bearings, leading to pump failure and eventual engine failure through overheating.
- Regular pressure checks on the coolant system will indicate any developing problems.
- As well as regular checks on the water pump drive belt, it is also worth checking that the pulley has not rotated on the shaft.
- Damper rubbers, as well as damping vibrations, can have a detrimental effect on the engine starting and should be replaced as soon as any deterioration is experienced.
- Regular carburettor balancing will assist engine starting.
- As well as low sparking plug life, the plug caps can give many problems, and it is advisable to replace them all on the annual inspection.
- A crack was discovered on the noseleg at the bottom of one web between the vertical downtube and the inverted U-shaped bracket that carries the nosewheel. See 'Safety Spot' February 2011. Dye-penetrant testing of the second-hand replacement noseleg showed cracks in the same area.
- The main undercarriage has been known to splay over time.
- Note that the life of the Hewland AE75 engine is limited to 20% beyond the limit published by the CAA for the Certificated version of the aircraft – there is no scope to extend this further. Between the published life limit (600 hours) and the 20% extension, the engine must be assessed 'on-condition' and maintained in accordance with the manufacturer's instructions.

3.5 Special Test Flying Issues

None known.

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