AIRWORTHINESS REQUIREMENTS

FULFILLS PA.I.B, CA.I.B, AI.III.B

Objective	
The student shall understand the equipment, inspections, and maintenance required for maintaining aircraft airworthiness. The student shall become familiar with identifying inoperative or discrepant components and determining whether that equipment is required for their flight.	
Instructor Actions	**Student Actions**
- Present and show the required documentation onboard an aircraft - Outline the required equipment and introduce the appropriate mnemonics - Explain the required maintenance actions and show the student the training aircraft's maintenance logbooks - Present where to find the training aircraft's TCDS AD list, and placards - Provide the student scenarios for determining airworthiness - Present images of discrepancies and abnormal conditions	- Take notes and participate in instructor's discussion - Memorize mnemonics - Find the training aircraft's TCDS and AD list - Participate in instructor's inoperative equipment scenario exercises - Incorporate ARROWSP into their preflight checklist
Case Studies	**Equipment**
	- Aircraft logbooks - Computer - FAR/AIM - Pilot's operating handbook
Completion Standards	
The student shall explain the requirements for aircraft airworthiness and the steps to determine if an inoperative item makes an aircraft unairworthy. The student shall display proficiency in parsing the required sources.	

OVERVIEW

RESOURCES

91.171	VOR Inspections
91.205	Airworthiness Requirements
91.207	ELT Inspections and Use
91.209	Aircraft Lights
91.213	Inoperative Equipment
91.409	Annuals and 100 Hour Inspections
91.411	Altimeter Inspections
91.413	Transponder Inspections

FAA-S-ACS-6C (Private Pilot ACS) - Area I Task B
FAA-S-ACS-7B (Commercial Pilot ACS) - Area I Task B
FAA-S-ACS-25 (CFI ACS) - Area III Task B

FAA-H-8083-25C Chapter 1: Introduction to Flying

1. DOCUMENTATION REQUIRED ONBOARD

ARROW

A Airworthiness Certificate (91.203)
R Registration Certificate (91.203)
R Radio Station License (international flights only)
O Operating Handbook (91.9)
W Weight and Balance (23.2620)
S Supplements (by equipment)
P Placards (per POH)

Airworthiness Certificate

An aircraft is granted an airworthiness certificate following an inspection after final assembly. Airworthiness certificates never expire, however they only remain valid if the aircraft is compliant with its inspections and equipment. Aircraft in the normal, utility, acrobatic, commuter, and transport categories receive "standard" certificates, and those in the Experimental, Restricted, Limited, Provisional, and Light-Sport Aircraft (LSA) categories receive special airworthiness certificates.

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION—FEDERAL AVIATION ADMINISTRATION
STANDARD AIRWORTHINESS CERTIFICATE

1 NATIONALITY AND REGISTRATION MARKS	2 MANUFACTURER AND MODEL	3 AIRCRAFT SERIAL NUMBER	4 CATEGORY
N88NL	CHRISTEN INDUSTRIES PITTS S-2B	5147	NORMAL & ACROBATIC

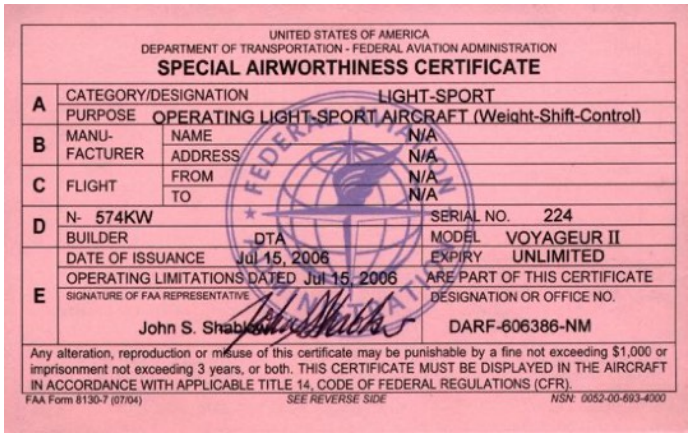
5. AUTHORITY AND BASIS FOR ISSUANCE
This airworthiness certificate is issued pursuant to the Federal Aviation Act of 1958 and certifies that, as of the date of issuance, the aircraft to which issued has been inspected and found to conform to the type certificate therefor, to be in condition for safe operation, and has been shown to meet the requirements of the applicable comprehensive and detailed airworthiness code as provided by Annex 8 to the Convention on International Civil Aviation, except as noted herein.
Exceptions
NONE

6 TERMS AND CONDITIONS
Unless sooner surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator, this airworthiness certificate is effective as long as the maintenance, preventative maintenance, and alterations are performed in accordance with Parts 21, 43, and 91 of the Federal Aviation Regulations, as appropriate, and the aircraft is registered in the United States.

DATE OF ISSUANCE	FAA REPRESENTATIVE	DESIGNATION NUMBER
09-12-88	WYNN O. BROWN	DMIR ANM-553

Any alteration, reproduction, or misuse of this certificate may be punishable by a fine not exceeding $1,000, or imprisonment not exceeding 3 years, or both. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE FEDERAL AVIATION REGULATIONS.

FAA Form 8100-2 (8-82) GPO 570-189



UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION
SPECIAL AIRWORTHINESS CERTIFICATE

A	CATEGORY/DESIGNATION	LIGHT-SPORT	
	PURPOSE	OPERATING LIGHT-SPORT AIRCRAFT (Weight-Shift-Control)	
B	MANU-FACTURER NAME	N/A	
	ADDRESS	N/A	
C	FLIGHT FROM	N/A	
	TO	N/A	
D	N- 574KW	SERIAL NO. 224	
	BUILDER DTA	MODEL VOYAGEUR II	
E	DATE OF ISSUANCE Jul 15, 2006	EXPIRY UNLIMITED	
	OPERATING LIMITATIONS DATED Jul 15, 2006	ARE PART OF THIS CERTIFICATE	
	SIGNATURE OF FAA REPRESENTATIVE John S. Shablow	DESIGNATION OR OFFICE NO. DARF-606386-NM	

Any alteration, reproduction or misuse of this certificate may be punishable by a fine not exceeding $1,000 or imprisonment not exceeding 3 years, or both. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE TITLE 14, CODE OF FEDERAL REGULATIONS (CFR).

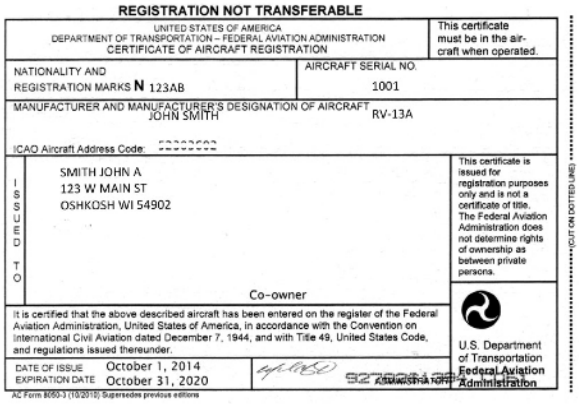
FAA Form 8130-7 (07/04) SEE REVERSE SIDE NSN: 0052-00-693-4000

Pilots of aircraft with special airworthiness certificates should understand they are specific limitations associated with operating that aircraft, depending on the type of aircraft.

All airworthiness certificates must be on full display at the cabin entrance per 91.203(b).

Registration

Registration certificates are valid for 7 years. These must simply be carried onboard the aircraft.



REGISTRATION NOT TRANSFERABLE

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION – FEDERAL AVIATION ADMINISTRATION
CERTIFICATE OF AIRCRAFT REGISTRATION

This certificate must be in the aircraft when operated.

NATIONALITY AND REGISTRATION MARKS N 123AB
AIRCRAFT SERIAL NO. 1001
MANUFACTURER AND MANUFACTURER'S DESIGNATION OF AIRCRAFT JOHN SMITH RV-13A
ICAO Aircraft Address Code: [illegible]

ISSUED TO
SMITH JOHN A
123 W MAIN ST
OSHKOSH WI 54902
Co-owner

This certificate is issued for registration purposes only and is not a certificate of title. The Federal Aviation Administration does not determine rights of ownership as between private persons.

It is certified that the above described aircraft has been entered on the register of the Federal Aviation Administration, United States of America, in accordance with the Convention on International Civil Aviation dated December 7, 1944, and with Title 49, United States Code, and regulations issued thereunder.

U.S. Department of Transportation Federal Aviation Administration

DATE OF ISSUE October 1, 2014
EXPIRATION DATE October 31, 2020

AC Form 8050-3 (10/2010) Supersedes previous editions

(CUT ON DOTTED LINE)

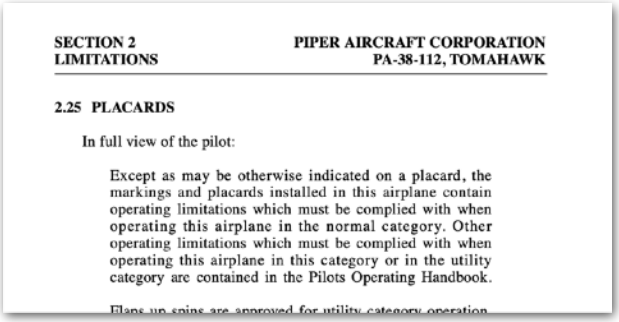
Radio Station License
FCC rules mandate the aircraft have a radio station license for international operations. These can be obtained from the FCC and are specific to the aircraft. International travel also requires at least one person on board to possess a Restricted Radiotelephone Operators Permit (RROP).

Operating Handbook
As outlined in 91.9, the aircraft must have a pilot's operating handbook onboard that matches the aircrafts serial number. A simple pilot's information manual is insufficient.

Weight and Balance
A current and accurate weight and balance is imperative to calculate loading and takeoff and landing distances.

Supplements
Certain equipment, such as GPS units or PFD/MFD systems, require a POH supplement to be carried on board.

Placards
Placards, such as maneuvering speed, maximum allowable baggage weights, and prohibited operations are defined in the aircrafts POH. These too are airworthiness items and must be installed in the aircraft.



SECTION 2 LIMITATIONS — PIPER AIRCRAFT CORPORATION PA-38-112, TOMAHAWK

2.25 PLACARDS

In full view of the pilot:

Except as may be otherwise indicated on a placard, the markings and placards installed in this airplane contain operating limitations which must be complied with when operating this airplane in the normal category. Other operating limitations which must be complied with when operating this airplane in this category or in the utility category are contained in the Pilots Operating Handbook.

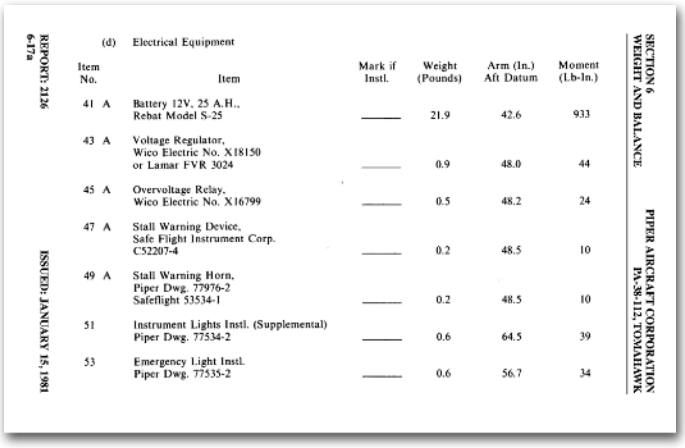
Flaps up spins are approved for utility category operation

2. EQUIPMENT REQUIRED FOR AIRWORTHINESS

Required equipment is decedent on the type of operation, such as day VFR, night VFR, and IFR. 91.205 outlines these requirements. Remember, night in this context "means the time between the end of evening civil twilight and the beginning of morning civil twilight, as published in the Air Almanac, converted to local time" per 14 CFR 1.1.

DAY VFR	NIGHT VFR VFR DAY, PLUS	IFR
A Airspeed indicator	**F** Fuses	**G**
T Tachometer	**L** Landing light (if for hire)	**R**
O Oil pressure gauge (for each engine)	**A** Anti-collision lights[3]	**A**
M Manifold pressure	**P** Position (nav) lights	**B**
A Altimeter	**S** Source of power	**C**
T Temperature gauge (for liquid cooled engines)		**A**
O Oil temperature gauge (for each engine)		**R**
F Fuel gauge		**D**
L Landing gear indicator (if applicable)		
A Anti-collision lights[1,2]		
M Magnetic compass		
E ELT (See 91.207, exceptions)		
S Safety belts		

Additional equipment may be required according to the aircraft's operating handbook, known as a "Kind of Equipment List", or KOEL. For example, section 6 of the Piper Tomahawk POH lists ancillary equipment required beyond 91.205, such as the over voltage relay and stall warning device.



REPORT: 2126
6-17a

(d) Electrical Equipment

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
41	A	Battery 12V, 25 A.H., Rebat Model S-25	____	21.9	42.6	933
43	A	Voltage Regulator, Wico Electric No. X18150 or Lamar FVR 3024	____	0.9	48.0	44
45	A	Overvoltage Relay, Wico Electric No. X16799	____	0.5	48.2	24
47	A	Stall Warning Device, Safe Flight Instrument Corp. C52207-4	____	0.2	48.5	10
49	A	Stall Warning Horn, Piper Dwg. 77976-2 Safeflight 53534-1	____	0.2	48.5	10
51		Instrument Lights Instl. (Supplemental) Piper Dwg. 77534-2	____	0.6	64.5	39
53		Emergency Light Instl. Piper Dwg. 77535-2	____	0.6	56.7	34

ISSUED: JANUARY 15, 1981

SECTION 6
WEIGHT AND BALANCE

PIPER AIRCRAFT CORPORATION
PA-38-112, TOMAHAWK

FAA airworthiness directives also sometimes indicate required equipment to be installed post-delivery. For example, AD 83-14-08 mandates the installation of stall strips, which then become required equipment not necessarily listed in 91.205 or the equipment list. Non-regulatory but pertinent safety information can also be found in Special Airworthiness Information Bulletins (SAIB), service letters (SL), and service bulletins (SB).

Minimum equipment lists (MEL) serve a similar purpose and KOEL's, but are typically reserved for Part 121 or 135 operations. AOPA outlines the MEL quite clearly:

> A minimum equipment list is a user-friendly, black-and-white way to determine whether problems affect the safety and legality of a flight. As the name implies, an MEL lists the minimum equipment and instruments that must properly operate before an airplane can legally fly. MELs are aircraft-specific right down to a registered aircraft and its owner. In other words, an MEL for Cessna Skyhawk 12345 cannot be used on Skyhawk 67890.

[1] For small civil airplanes certificated after March 11, 1996
[2] By 91.209(b), must be on at all times
[3] By 91.205(c), on all US registered aircraft

An MEL identifies the aircraft's equipment and instruments individually, and specifies each item that may be inoperative for various combinations of day and night VFR and IFR operations. If an item isn't required by the MEL for the intended operation, the airplane may be legally flown if the item is either removed, or deactivated and placarded.

Talking with an inspector at the local FAA Flight Standards District Office (FSDO) is the first step in getting an approved MEL for an aircraft. You don't create an MEL from scratch. The FAA has make-and-model-specific Master MELs (MMELs) for many multiengine aircraft and a generic single-engine MMEL. You customize the applicable MMEL to the specific equipment requirements for your airplane.

Items on the MMEL that are not installed in your aircraft are deleted. Equipment in your aircraft but not on the MMEL are added to the list. When this task is completed, you submit the MEL with a request to the FSDO. The request is usually evaluated by FAA representatives specializing in operations, airworthiness, and avionics. Once the MEL is agreed upon, you and the FAA sign a letter of authorization, which enables you to use the MEL.

Required equipment might also be found in the aircraft type certification data sheet (TCDS), as found on the FAA's website.

3. INSPECTIONS REQUIRED FOR AIRWORTHINESS

Name	Frequency	Notes	Regulation
A Annual/AD's	12 months	AD's may be recurring at time or hourly intervals	91.409(a)(1)
V VOR Check	Preceding 30 days	Required if to be used on IFR flight	91.171
I 100 Hour	100 hours time in service if for hire	10 hour overfly permitted, albeit not included in TIS calculation	91.409(b)
A Atimeter	24 months if IFR	IFR only	91.411
T Transponder	24 months	All aircraft with transponders	91.413
E ELT	See note	2 inspections: 12 month conditional and battery replacement at half useful life or after 1 hour continuous use	91.207
S Static System	24 months if IFR	IFR only	91.411

3.1. Types of VOR Inspections

VOR inspections may be performed by any pilot, so it is important to understand the types of inspections to meet the requirements of 91.171.

VOT (VOR Test Facility) – At airports with a VOR test facility, tune the VOR to 180° and confirm the flag flips to FROM. Then, tune to 360° and confirm the flag reads TO. For both checks, confirm the needle centers within 4°.

VOR Checkpoint – Some airports have a designated ground location of known bearing/radial to a local VOR. Aircraft can taxi to this location and determine the error between the VOR and the known bearing/radial. Confirm the needle centers within 4°.

Airports with these facilities can be found at the end of the chart supplement.

ARIZONA
VOR RECEIVER CHECKPOINTS

Facility Name (Airport Name)	Freq/Ident	Type Check Pt. Gnd. AB/ALT	Azimuth from Fac. Mag.	Dist. from Fac. N.M.	Checkpoint Description
Kingman (Kingman)	108.8/IGM	G	220	1.0	Ctr r/u area apch end Rwy 03.
Libby (Sierra Vista Muni/Libby AAF)	113.6/FHU	G	80	1.3	Runup area Twy G at Rwy 26 end.
Page (Page Muni)	116.45/PGA	G	168	0.8	Twy A runup nr Rwy 33.
Tucson (Tucson Intl)	116.0/TUS	G	318	0.7	On runup pad NE of Twy A17.
Willie (Phoenix–Mesa Gateway)	113.3/IWA	G	299	1.4	On Twy G between Rwy 12R and Rwy 12C.
	113.3/IWA	G	124	0.6	On Twy P runup area 30C

VOR TEST FACILITIES (VOT)

Facility Name (Airport Name)	Freq.	Type, VOT Facility	Remarks
Phoenix Sky Harbor Intl	109.0	G	
Prescott (Prescott Rgnl-Ernest A. Love Fld)	110.0	G	

Dual VOR Check – In aircraft with two VOR's, simply tune each VOR to the same facility and same bearing/radial and compare the difference. This can be accomplished on the ground or in air. Confirm the needle enters within 4°.

Airborne VOR Check – Sometimes none of the options are possible. In that case

1. Select a VOR radial that lies along the centerline of an established VOR airway
2. Select a prominent ground point along the selected radial preferably more than 20 nautical miles from the VOR ground facility and maneuver the aircraft directly over the point at a reasonably low altitude
3. Note the VOR bearing indicated by the receiver when over the ground point

Confirm the needle centers within **6°**.

Recording the Inspection

Record, most commonly in the VOR log, your signature, place, error, and date (SPED). This is required by 91.171.

4. FINDING INOPERATIVE EQUIPMENT

The pilot should consult:
91.205, KOEL's, AD's, MEL's (if applicable), and the **TCDS.**

If flight is permitted with the inoperative equipment, it must be placarded inoperative and deactivate or removed per 91.213.

5. SPECIAL FLIGHT PERMITS AND FERRY PERMITS

Sometimes, unairworthy aircraft must be flown to a location where repairs or inspections can be made. The FAA allows these flights after the pilot receives a special flight permit.

"A Special Flight Permit-SFP (commonly referred to as a Ferry Permit) may be issued to any U.S. registered aircraft that may not currently meet applicable Airworthiness Requirements but is capable of safe flight. The SFP will be issued by the FSDO geographically responsible for the area in which the flight is to originate" (FAA Docket).

6. MAINTENANCE

Annuals – Require A&P with IA

Items in Part 43 Appendix A Preventive Maintenance – require pilot certificate issued under Part 61 and ownership of aircraft (although not exhaustive, see Coleal 2009)

Everything else – Assume A&P