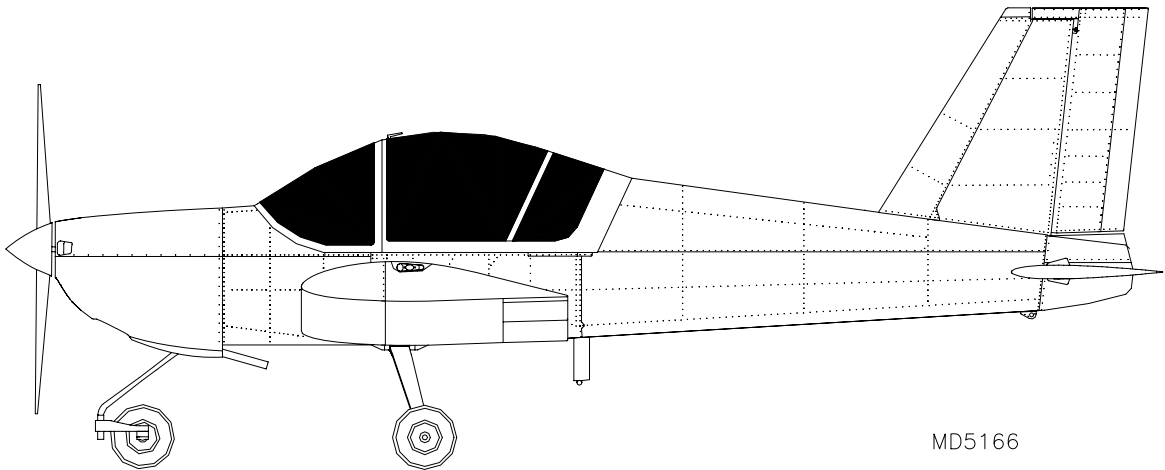


# RANS

## *S-19 VENTERRA*

TEXT MANUAL



MD5166

Serial Number:

Registration Number:

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**RANS DESIGNS**  
4600 HWY 183 Alt  
HAYS, KANSAS, USA 67601  
785-625-6346  
[www.rans.com](http://www.rans.com)



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

800 Independence Ave., SW.  
Washington, DC 20591

SEP 28 2011

Mr. Randy Shlitter, CEO  
Rans Designs, Inc.  
4600 Hwy 183 Alt,  
Hays, KS 67601

Dear Mr. Shlitter:

The Federal Aviation Administration (FAA) National Kit Evaluation Team performed an evaluation of the "S-19 Venterra" amateur-built aircraft kit at your facility on August 17, 2011. The team has determined that the kit, defined by the S-19 Venterra Builder's Manual, dated 4/1/2011, and all S-19 Venterra packing lists, dated 4/1/2011, may allow an amateur builder to meet the major portion requirement of Title 14, Code of Federal Regulations part 21, Certification Procedures for Products, Articles and Parts, § 21.191(g).

The Production and Airworthiness Division (AIR-200) will have the kit added to the Revised Listing of Amateur-Built Aircraft Kits located on the FAA website. This evaluation does not mean that the "S-19 Venterra" aircraft or Rans Designs, Inc. is FAA "*Certified*," "*Certificated*," or "*Approved*," and it is inappropriate to represent either as such.

Rans Designs, Inc. should notify this office in writing if ownership of the company changes and/or if there are changes made to the evaluated kit. Failure to notify this office may result in removal of the kit from the List of Amateur-Built Aircraft Kits.

If you have any questions, please contact the Evaluations and Special Projects Branch, AIR-240, at (202) 385-6346.

Sincerely,

Terry A. Allen  
Acting Manager, Production and Airworthiness  
Division

Enclosure  
Amateur-Built Aircraft Fabrication and Assembly Checklist (2009)



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

Small Airplane Directorate  
Manufacturing Inspection Office  
901 Locust Street, Room 301  
Kansas City, Missouri 64106

October 22, 2014

Mr. Randy Schlitter  
RANS Design, Inc.  
4600 Highway 183 Alt  
Hays, Kansas 67601

Dear Mr. Schlitter:

The Federal Aviation Administration (FAA) National Kit Evaluation Team (NKET) completed an evaluation of the RANS Design, model S-19 Venterra Quick Build and S-20 Raven Standard kits at your facility on September 23-25, 2014. These kits are defined by the Packing List dated 09/24/2014 (S-19 QB) and 09/01/2013 (S20). The team determined that these kits may allow an amateur builder to meet the major portion requirement of title 14, Code of Federal Regulations part 21, Certification Procedures for Products and Parts, § 21.191 (g).

We will advise the Aircraft Certification Service' Certification Procedures Branch to add the kits to the Revised Listing of Amateur-Built Aircraft Kits (Kit List) located on the FAA website. This evaluation does not mean that the S-19 or S-20 aircraft or RANS Design, Inc. are FAA "*certified, certificated, or approved*", and it is inappropriate to represent either as such.

RANS Design, Inc. should notify this office in writing if ownership of the company changes and or if there are changes made to the evaluated kit that may affect its potential to meet the major portion requirement. Failure to notify this office may result in removal of the kit from the Kit List.

If you have any questions, please contact the Manufacturing Inspection Office (MIO) at (816) 329-4180

Sincerely,

James E. Jackson  
Manager, Manufacturing Inspection Office, ACE-180

Enclosure—Amateur-Built Aircraft Fabrication and Assembly Checklist

## TEXT MANUAL INDEX

GENERAL INFO .....	00
GETTING STARTED .....	01
EMPENNAGE (TAIL) GROUP .....	02
WING ASSEMBLY .....	03
FLAP AND AILERON ASSEMBLY .....	04
FUSELAGE – CENTER SECTION .....	05
FUSELAGE – FORWARD SECTION .....	06
FUSELAGE - TAILCONE .....	07
FUSELAGE – SYSTEMS.....	08
MAIN & NOSE GEAR .....	09
WINDSHIELD AND CANOPY .....	10
SEAT ASSEMBLY AND INSTALLATION .....	11
OPTIONAL INTERIOR.....	12
ENGINE INSTALLATION.....	13
SPINNER & COWLING INSTALLATION.....	14
PREPARATION FOR FLIGHT .....	15
WEIGHT AND BALANCE .....	16
OPERATIONS MANUAL.....	17
APPENDIX.....	APPENDIX

## 00 - GENERAL INFO

HOW TO ASSEMBLE YOUR S-19 ASSEMBLY MANUAL.....	00-1
REVISION FORM .....	00-4
TECHNICAL SUPPORT .....	00-6
AIRCRAFT TOOL LIST.....	00-7
HAND TOOLS.....	00-7
POWER TOOLS .....	00-7
LUBRICANTS, ADHESIVES & TAPES.....	00-7
CLECO FASTENERS .....	00-8
DRILL BIT, REAM SIZES & COUNTERSINK CUTTERS .....	00-8
TOOLS AND MATERIALS NEEDED FOR CASTING LEAD BALLAST WEIGHTS .....	00-8
INVENTORY, PREPARATION AND WORKSPACE .....	00A-1
AIRCRAFT REGISTRATION .....	00B-1
OBTAINING AN "N" NUMBER (Registration) .....	00B-1
AFFIDAVIT OF OWNERSHIP FORM .....	00B-2
REGISTERING YOUR AIRCRAFT .....	00B-3
RECEIVING AUTHORITY TO FLY YOUR AIRCRAFT.....	00B-3
WHAT IS THE PROCEDURE FOR OBTAINING AN AIRWORTHINESS CERTIFICATE.....	00B-3
I FEEL I AM READY FOR INSPECTION BY THE FAA INSPECTOR, WHAT DO I DO? .....	00B-4
FINAL INSPECTION.....	00B-5
SAMPLE CHECKLIST FOR A CONDITION INSPECTION .....	00B-9
NUMBERING AND PLACARDS .....	00B-13
DISPLAY OF MARKS .....	00B-13
SIZE OF MARKS .....	00B-13
IDENTIFICATION PLATE .....	00B-14
AIRCRAFT INSTRUMENT MARKINGS & COCKPIT PLACARDS.....	00B-15
GENERAL .....	00B-15
MARKINGS AND PLACARDS .....	00B-15
POWERPLANT INSTRUMENT MARKINGS .....	00B-15
AIRSPEED INSTRUMENT MARKINGS .....	00B-16
AIRSPEED PLACARDS.....	00B-16
LANDING GEAR .....	00B-16
CONTROL MARKINGS.....	00B-16
POWERPLANT FUEL CONTROLS.....	00B-16
FLIGHT MANEUVER PLACARD .....	00B-17
BAGGAGE PLACARD .....	00B-17
PASSENGER WARNING PLACARD.....	00B-17
OPERATING LIMITATIONS .....	00C-1

MANDATORY TEST FLIGHT PROVING PHASE ..... 00C-1  
PURPOSE OF THE FLIGHT TEST PERIOD..... 00C-1  
DURATION OF MANDATORY FLIGHT TEST PERIOD..... 00C-2  
FLIGHT TEST AREA ..... 00C-2  
OTHER LIMITATIONS DURING THE FLIGHT TEST PERIOD ..... 00C-3  
AIRCRAFT FLIGHT LOG..... 00C-3

REPAIRMAN'S CERTIFICATION ..... 00C-4

ROTAX® ENGINE WARRANTY INFORMATION..... 00D-1

# GENERAL INFO

## HOW TO ASSEMBLE YOUR S-19 ASSEMBLY MANUAL

Your manual is ready for assembly:

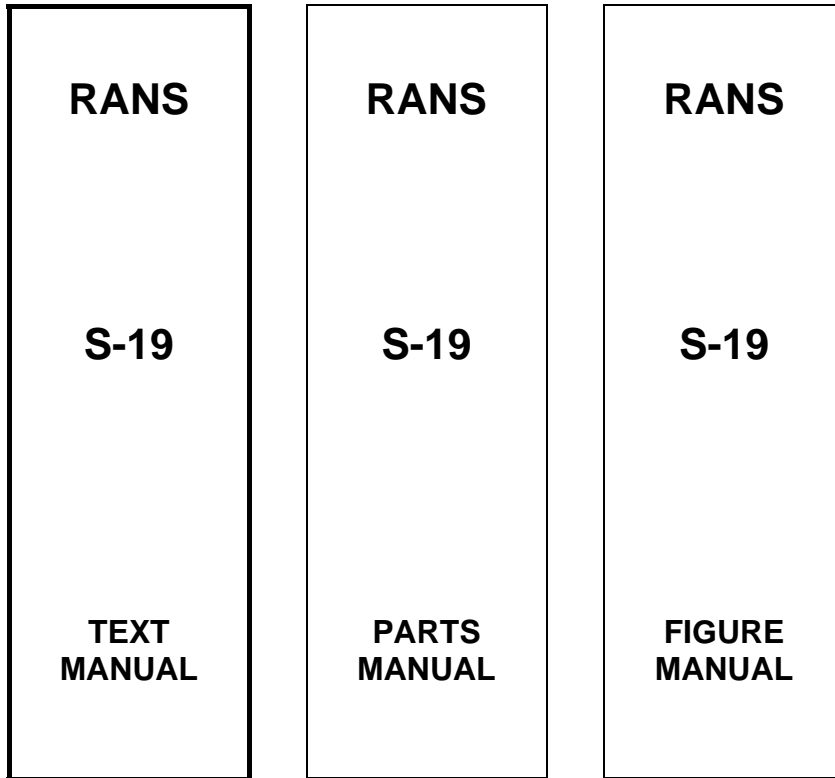
1. Place the TEXT manual in the larger 3 ring binder. Place the PARTS and FIGURES manuals in the smaller 3 ring binders. Every page has a section number then a page number within that section. (Example: parts page 06-02) Parts pages have an exploded view and a parts listing. **NOTE: The PARTS manual pages will need to rotate to allow viewing as shown on FIGURE 00-01 in the FIGURE manual.**
2. Separate the sections with the tab inserts listed below. Follow the table of contents for the order that the manual should follow.
3. Cut out and slip in the labels to corresponding sections.

00 - GENERAL	01 - GETTING STARTED	02 - VERTICAL STABILIZER	02A - RUDDER	02B - STABILATOR	02C - ANTI-SERVO TAB	03 - WINGS	04 - FLAPS & AILERONS	04 - FLAPS & AILERONS	05 - CENTER FUSELAGE	06 - FWD FUSELAGE	07 - TAIL CONE FUSELAGE	08 - FUSELAGE SYSTEMS	09 - MAIN & NOSE GEAR	10 - CANOPY	11 - SEAT	12 - OPTIONAL INTERIOR	13 - ENGINE	14 - COWL & SPINNER	15 - PREPARATION FOR FLIGHT	16 - WEIGHT & BALANCE	17 - OPERATIONS	18 - ENGINE	19 - ENGINE	20 - ENGINE	21 - ENGINE	22 - ENGINE	23 - ENGINE	24 - ENGINE	25 - ENGINE	26 - ENGINE	27 - ENGINE	28 - ENGINE	29 - ENGINE	30 - ENGINE	31 - ENGINE	32 - ENGINE	33 - ENGINE	34 - ENGINE	35 - ENGINE	36 - ENGINE	37 - ENGINE	38 - ENGINE	39 - ENGINE	40 - ENGINE	41 - ENGINE	42 - ENGINE	43 - ENGINE	44 - ENGINE	45 - ENGINE	46 - ENGINE	47 - ENGINE	48 - ENGINE	49 - ENGINE	50 - ENGINE	51 - ENGINE	52 - ENGINE	53 - ENGINE	54 - ENGINE	55 - ENGINE	56 - ENGINE	57 - ENGINE	58 - ENGINE	59 - ENGINE	60 - ENGINE	61 - ENGINE	62 - ENGINE	63 - ENGINE	64 - ENGINE	65 - ENGINE	66 - ENGINE	67 - ENGINE	68 - ENGINE	69 - ENGINE	70 - ENGINE	71 - ENGINE	72 - ENGINE	73 - ENGINE	74 - ENGINE	75 - ENGINE	76 - ENGINE	77 - ENGINE	78 - ENGINE	79 - ENGINE	80 - ENGINE	81 - ENGINE	82 - ENGINE	83 - ENGINE	84 - ENGINE	85 - ENGINE	86 - ENGINE	87 - ENGINE	88 - ENGINE	89 - ENGINE	90 - ENGINE	91 - ENGINE	92 - ENGINE	93 - ENGINE	94 - ENGINE	95 - ENGINE	96 - ENGINE	97 - ENGINE	98 - ENGINE	99 - ENGINE	100 - ENGINE
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Labels for the exterior of each manual may be made from self-stick labels. The format below may be used.



Use the revision form on the next page to record any manual revisions sent to you by RANS.



# **RANS Designs**

## **4600 Highway 183 Alternate**

### **Hays, KS 67601**

**Technical Support**  
**(785) 625-0069**  
**actech@rans.com**

**Parts Department**  
**(785) 625-6346**  
**parts@rans.com**

When calling Technical Support or the Parts Department please have the following ready:

- Aircraft Model
- Serial Number
- Engine Model
- Parts Number Needed (Parts Department Only)
- Your Aircraft Assembly Manuals

***NOTE: Please make your questions precise and to the point, so that we may assist as many customers as possible.***

## RANS AIRCRAFT TECHNICAL SUPPORT

RANS has taken care to provide clear, comprehensive, and straightforward instructions for assembly, maintenance, and operation by reference to manuals alone. In the event a question arises for which no answer seems apparent, feel free to contact RANS headquarters.

Physical and mailing address:.....RANS Designs  
4600 Highway 183 Alternate  
Hays, KS 67601

Voice: ..... 785-625-6346  
Fax: ..... 785-625-2795  
E-mail (General) ..... rans@rans.com  
E-mail (Aircraft Tech)..... actech@rans.com  
E-mail (Aircraft Parts) ..... parts@rans.com  
Internet site:..... www.rans.com  
Aircraft Technical Support: ..... 785-625-0069  
Aircraft Parts Department: ..... 785-625-6346

*When calling for parts or technical assistance, have the aircraft model, serial number, engine model number, and assembly manuals at hand.*

**Questions about propeller care and adjustment and about engine break-in, operation, and maintenance should be directed to respective manufacturer's or supplier's technical support personnel. Refer to manufacturer's or supplier's literature for instructions and contact information.**

## AIRCRAFT TOOL LIST

The following is a list of tools that will be helpful when assembling your RANS S-19.

### **HAND TOOLS**

Pliers	Safety Wire Pliers
Needle Nose Pliers	Vise Grip Pliers
Needle-Nose Vise Grip Pliers	Side Cutters
Wire Strippers	Small spring clamps
Aviation Snips	Hand Pop-Rivet Tool
Hammer	Click Punch
Rubber Mallet*	Screwdriver Set
Several Small Clamps	Safety Glasses
Wrench Set SAE & Metric	Socket Set - SAE & Metric
Ruler & Tape Measure	2 or 4 ft. Level
Adjustable Fly Cutter*	Utility Knife
Set of Drill Bits (sizes listed below)	Files
Deburring Tool	Scotch-Brite Pads
Cleco pliers	Digital Protractor*
Fluting Pliers	Flanging (Edge Rolling) Tool

### **POWER TOOLS**

Electric Hand Drill	Small Electric Grinder
Dremel*	Bench Disk Sander*
Soldering Iron	Heat Gun*
CD or MP3 Player*	Right Angle Drill and Bits

It is highly recommended that you use a pneumatic riveter.  
These are the pneumatic riveters that we use at RANS.

Marson V2 lightweight pneumatic riveter P/N 79014

MSC Industrial Supply Co. P/N 04053278

### **LUBRICANTS, ADHESIVES & TAPES**

Small Can Lithium Grease	Clear Silicone
Contact Cement	WD40
Super Glue	Lubricating oil
Drill Lubricant (We use Walter Cool-Cut) *	Glue Stick
Double Stick Tape	3M™ Brand #471 Vinyl Tape
PVC Cleaner and Cement	DOW 730 Sealant or similar

**CLECO FASTENERS**

The following are considered minimum quantities.

200	3/32"	(Cadmium / Silver)
200	1/8"	(Copper)
20	5/32"	(Black)
20	3/16"	(Brass / Gold)

**DRILL BIT, REAM SIZES & COUNTERSINK CUTTERS**

A Unibit® Step Drill ranging from 1/4" to 3/4" and conventional bits ranging from 1/8" to 3/8" is strongly recommended.

In addition to these the following bits will be required to assemble your S-19.

**CONVENTIONAL BITS**

#50  
#40  
#30  
#28  
#21  
#11  
Letter N  
1/2" & 3/4" Unibit® Step Drill

**RIGHT ANGLE**

#40  
#30  
#11

**LONG BITS**

#40 – 6"  
#40 – 12"\*  
#30 – 6"

**REAMS**

0.1885"  
0.249"  
0.3115  
0.375"

**COUNTERSINK CUTTERS**

100 Degree

**TOOLS AND MATERIALS NEEDED FOR CASTING LEAD BALLAST WEIGHTS**

Hot plate	Lead flux
Stainless steel spoon	Scale
Scrap wood	Screws or clamps
Lead (Tire shops are a good source)	Safety glasses
Respirator	Welding apron and gloves
Crucible (Or small sauce pan able to withstand 900°F)	

\* Indicates optional items. These are not required, but may make building easier

## INVENTORY, PREPARATION AND WORKSPACE

**TAKE INVENTORY:** You must complete an inventory within 60 days of receiving your kit.

We check and re-check and are 99.9% certain that if we say we shipped it, we did. The first task in building your kit is to inventory the parts using the packing list provided. It's your job to keep all parts organized and accounted for. We cannot provide missing parts cost free after 60 days. Use the supplied pack list to verify that everything that we packed is in the box. The fast way to inventory is to use the Priority Number that appears on the Part Number labels, these will match the pack list in numeric order. Go through the list item by item. If anything is not there that should be, please contact our parts department immediately. **HINT:** Use sections of plywood from the packing crate to fabricate a part inventory board. See **FIGURE 00-02**. As each part is inventoried and checked off on the pack list, staple the bag to the board. This allows for quick identification and part selection during assembly. Organize your parts so they are easy to find. Bolts with bolts, washers with washers, etc. We fabricate "A" Frame stands to support the plywood. Plywood can also be attached to shop walls.

**IMPORTANT:** When hanging the parts on the board, use the aircraft section designator of the part number to organize the parts. For an explanation of the part number and the meaning of the letters in the prefix see **EF-38E** in the appendix.

**WORKSPACE:** You will need the space of a 1 car garage to complete most of the aircraft. If your space is this small you will need to organize your space very well and it will need to be free of any other projects or clutter. One of the keys to working in small space is to build the parts that are flat and can be stored easily first, such as the wings and the tail group. Once a part is completed use some of the crate wood to build racks to hold the part high on the wall or against the ceiling.

The most important item needed for building the S-19 is a 4' X12' Worktable. We made ours using 6 4X4 timbers for the legs with a 2X4 box structure at the base to provide more stability and a shelf for storage. We also put ours on casters so it can be moved easily. **NOTE:** The worktop should be built as flat as possible. This is the jiggging surface for all the aircraft structures. A few padded sawhorses are needed also.

**PLEASE READ:** We highly recommend that you completely read the manual cover to cover before beginning assembly of your aircraft. This will help to eliminate costly mistakes and considerably speed up your build time. As you read through the Assembly Manual, follow along in the Parts and Figure Drawings Manual. Study each and every parts and figure drawing. The Assembly, Parts, and Figure Drawing manuals will parallel each other; however, at times the assembly manual will use parts from two or more pages of the Parts manual. **PLEASE NOTE:** *Unless otherwise noted, all Figure and exploded view drawings are **NOT** to scale.*

**GET ORGANIZED!** Prepare your workshop; be certain that what comes in the door will be able to go out!

**KEEP IT CLEAN:** Wash your hands, tools, and work tables. You will notice most of the parts are labeled with part numbers. These labels are easily removed with a cloth dampened with acetone or lacquer thinner.

---

**CAUTION:** *Do no allow acetone, lacquer thinner, Loctite, or fuel to come in contact with the canopy or Lexan material.* These and some other solvents will destroy the canopy or Lexan. **PLEASE NOTE:** *Isopropyl alcohol works best on powder-coat finishes.*

---

**STEEL PREPARATION:** Even though every care is taken to assure a safe arrival of your aircraft, thoroughly inspect the steel parts for the following: unclosed welds, nicks, and dents. If you locate any suspect areas with excessive dents or scratches call our Tech-Staff for information on damage tolerance. All Welded steel parts will require primer and top coating. We recommend a good epoxy primer or zinc-chromate. It is a good idea to prime all of the steel parts right when you receive your kit. All steel parts must be sanded and any surface corrosion removed before priming.

**ASSEMBLY SEQUENCING:** We have tried to format the manual in a step-by-step order as to how to assemble your aircraft. However, there is truly no "one" order in which to follow. If you should choose to build your fuselage first rather than the wings, it is acceptable to do so.

**DEBURRING:** Many parts will need to be deburred. This is an IMPORTANT step and must be performed. Assembly of parts with burrs can cause stress risers and eventual part failure. Refer to **FIGURE 00-03**. Various tools can be used. A deburring tool is nice but a 1/2" drill bit can do a good job on most holes. Radius and smooth sharp corners with files or fine grit sanders and grinders. Edges of certain parts also need deburring...a good file works here.



**CLECOS:** The tool list calls out the minimum quantity required. You may wish to purchase more. These are temporary fasteners that will be used to hold things together while fitting and drilling. A pair of Cleco pliers is required to install and remove the clecos. The cleco's are color coded as to hole size.

Cadmium (Silver)	3/32"	(#40)
Copper	1/8"	(#30)
Black	5/32"	(#21)
Brass (Gold)	3/16"	(#11)

To use, simply set cleco in the special pliers, squeeze closed, insert into the hole and release. (Reverse for removal). You'll find the clecos to be extremely useful throughout assembly.

**ROD ENDS:** When installing rod ends and similar hardware, be certain at least **ten threads** are engaged, unless directed otherwise within the text.

**RIVETS:** Your kit is supplied with various sizes of aluminum and stainless steel pop rivets. Even though we are careful, there is always the chance of the packages being mis-labeled. So before riveting, be sure to double check that you have the correct aluminum or stainless steel pop rivet for the particular section you are working on.

**MARKERS:** Throughout the manual you are instructed to mark on various parts. Use flairs or any type of felt tip marker. Avoid using pencils. The graphite in the lead will cause the aluminum to corrode.

**AN & RIVET CHARTS:** All bolts and rivets furnished with the kit are labeled as to their size. In the event they become mixed or you question the size or length of a particular bolt or rivet, we have included an AN bolt chart and a rivet chart. These charts are located in the appendix.

**ORIENTATION:** Throughout the Manual you will be asked to refer to specific stations of the fuselage. Station One (S-1) is the first structural member starting at the nose of the plane. Progressing towards the tail we pass all stations.

When a left hand side part is called out, this means the plane's left or your left if you were sitting in the cockpit looking forward.

**SERIAL NUMBER:** Please record your serial number and have it handy whenever you call into the factory for assistance. The serial number is on an engraved stainless steel plate which is riveted to the fuselage tailcone under the forward edge of the stabilator. Refer to **FIGURE 00-04**.

**HAVE FUN!** A RANS aircraft is almost as much fun to build as it is to fly and with a little care and planning, your ship could be a show stopper...Send us and the magazine's pictures of your work in progress or your finished plane.

Send your completion photos to EAA Sport Planes, Experimenter, or Kit Planes. They love to see completed kit planes,...don't be shy, **SHOW IT OFF!!**

**AS ALWAYS, WE'RE HERE TO HELP.**  
**GIVE US A CALL IF YOU RUN INTO A PROBLEM.**

# AIRCRAFT REGISTRATION

## Introduction:

All aircraft of U.S. registry are required to have the following documentation onboard. For aircraft registered in other countries contact your National Aviation Authority.

Certificate of **A**irworthiness  
**R**egistration  
**O**perating Limitations  
**W**eight and Balance Information

**NOTE:** The bold letters above spell out AROW. This acronym is often used to help remember the required documents.

## **OBTAINING AN "N" NUMBER (Registration)**

In order to register your plane, it will be necessary to obtain an identification number for the plane. This is referred to as an "N" number.

If any number is acceptable to you, write to:

FAA Aircraft Registry  
Dept. of Transportation  
P.O. Box 25504  
Oklahoma City, OK 73125

Ask them to assign you a free U.S. identification number of their choice.

If you prefer a number of your own choosing or a smaller number, you may be able to obtain the exact number you want by asking the FAA registry to assign you a specific number of your choice.

N-Numbers consist of a series of alphanumeric characters.

U.S. registration numbers may not exceed five characters **in addition** to the standard U.S. registration prefix letter **N**.

These characters may be:

- one to five numbers (N12345)
- one to four numbers followed by one letter (N1234Z)
- one to three numbers followed by two letters (N123AZ)

To avoid confusion with the numbers one and zero, the letters I and O are not to be used.

An N-Number may not begin with zero. You must precede the first zero in an N-Number with any number 1 through 9. For example, N01Z is not valid.

If you request a special "N" number it would be best to list at least five choices in case your first choice is not available. A special number of your own choosing will cost \$10.00 and you should enclose that fee with your letter.

### **When To Obtain Your "N" Number**

If you plan to complete your kit within a very short time, it is recommended that you obtain your "N" number right away. If your project will be fairly lengthy, you will not need to obtain your number until the last several months of construction. Keep in mind that if you request a special "N" number it can be reserved for no longer than one year. If this number has not been affixed to the fuselage within this time and the registration completed, it will be necessary to pay an additional \$10.00 to reserve that number for another year.

### **AFFIDAVIT OF OWNERSHIP FORM**

In the appendix you will find an Affidavit of Ownership Form. This form should accompany your letter requesting the assignment of an "N" number. Obtain the most current form at [www.faa.gov](http://www.faa.gov).

This form must be notarized as it establishes your ownership to the airplane even though you know you did build it. It will be used by the FAA to create a file on your aircraft and will serve as a legal document and a **substitute for the Bill of Sale** (AC Form 8050-2) that a buyer gets when he buys any existing airplane. Have handy a copy of your Sales Invoice from us.

## **REGISTERING YOUR AIRCRAFT**

After you have written the Aircraft Registry requesting an "N" number, you will receive a form letter giving your number assignment. You will also receive a blank Aircraft Registration Form. (Sample Enclosed.) Complete the Application for Aircraft Registration (Form 8050-1) and return it to the Aircraft Registry along with the \$5.00 registration fee.

Retain the **PINK** copy of the Registration and mail both the **WHITE** original and the **GREEN** copy. Your **PINK** copy is your authority to operate the aircraft, **when carried in the aircraft with an appropriate and current airworthiness certificate.**

## **RECEIVING AUTHORITY TO FLY YOUR AIRCRAFT**

Registration alone does not authorize you to fly your aircraft. The aircraft must, after it has been properly registered, also obtain an Airworthiness Inspection by an inspector for the FAA, at which time the necessary Airworthiness Certificate may be issued. Then, and only then, is your aircraft ready for flight.

## **WHAT IS THE PROCEDURE FOR OBTAINING AN AIRWORTHINESS CERTIFICATE**

Since the final step in obtaining an Airworthiness Certificate is to obtain an inspection of your airplane by an official for the FAA, it is a good idea to make an early contact with the FAA inspector's office nearest your home. Members of the local EAA chapter or a local flying service may be able to help direct you to this office. The purpose of such an early contact would be to discuss with the FAA representative, your proposed home built project and to generally familiarize yourself with the procedures established by the FAA for home built projects. At this time you can establish a tentative plan for inspection of the aircraft upon completion. The typical FAA inspector is interested in your project and wants to help you do a good job. A person that has been designated by the FAA for the purpose of inspecting aircraft is a Designated Airworthiness Representative or DAR. It is a good idea to contact the DAR that you plan to use and ask him what he would like to see at inspection.

The FAA requires that everyone building an airplane must maintain a construction log of the work he does on his airplane. You can use a notebook of conventional size and keep a daily diary of the work done on your aircraft. It is a good idea to also make notes in the Assembly Manual as well as listing dates when certain procedures were done. It is a very good idea to take photographs of work on your plane in various stages. This helps to document that you, the builder, actually completed 51% of this kit. (The latest revision of Advisory Circular 20-27 (AC 20-27) is available from the FAA or EAA describes the procedure used so that your logbook will be a verification of having completed at least 51% of the aircraft yourself.)

**MY AIRCRAFT IS COMPLETED, ALL MARKING AND PLACARDS ARE IN PLACE. WHAT ELSE MUST I DO TO MY AIRCRAFT BEFORE I AM READY FOR MY PRE-CERTIFICATION INSPECTION?**

Included in your manual is a weight and balance sheet. This will need to be completed before the inspection.

You will need a logbook for the aircraft. These can be separate books for the airframe, engine and propeller or just one.

**I FEEL I AM READY FOR INSPECTION BY THE FAA INSPECTOR, WHAT DO I DO?**

If you have had prior contact with your DAR, you will probably be familiar with the procedures used by that DAR. Different DAR's have slightly different procedures. Some inspectors will help you fill out the paperwork at the time of inspection. Others require that you submit the paperwork prior to inspection. If you are not sure and there are no other builders in your area to ask, you could call and ask the DAR. Below is the required paper work. Obtain the most current forms at [www.faa.gov](http://www.faa.gov).

1. A letter requesting a final inspection.
2. Form 8130-12 Eligibility Statement (sample in the appendix).
3. Form 8130-6 Application for Airworthiness Certificate (sample in the appendix).
4. A 3-view drawing of the aircraft or photos of topside and front view.

Include with this the following:

Horsepower rating of engine and type of prop.

Empty weight and maximum weight at which the aircraft will be operated.

Number of seats and their arrangement (tandem, side by side).

Whether single or dual controlled.

Fuel capacity.

Maximum speed at which you expect to operate the aircraft.

5. Estimated time or number of flights required. (Usually 25 hours for aircraft equipped with certified aircraft engine and prop combinations and 40 hours for those with non-aircraft engine propeller combinations.)

6. The area over which you will be testing. (Request an area encompassing a 25 mile radius for day VFR operations. Exclude congested areas and airways, but try to include nearby airports even if a few miles beyond the 25 mile radius.

Upon satisfactory completion of the necessary final FAA inspection of the aircraft and whatever ground tests may be required, the FAA Inspector will issue your amateur-built "Experimental" Airworthiness Certificate. Along with the certificate you will be given certain "**OPERATING LIMITATIONS**" under which you must operate the aircraft.

## FINAL INSPECTION

Use the 2 lists below for inspection of the aircraft. Refer to [www.faa.gov](http://www.faa.gov). These should be very helpful in getting your airplane signed off by the FAA Inspector and ensuring that your airplane is safe for operation.

### **Title 14 Aeronautics and Space**

#### **Appendix D to Part 43—Scope and Detail of Items (as Applicable to the Particular Aircraft) To Be Included in Annual and 100-Hour Inspections**

- (a) Each person performing an annual or 100-hour inspection shall, before that inspection, remove or open all necessary inspection plates, access doors, fairing, and cowling. He shall thoroughly clean the aircraft and aircraft engine.
- (b) Each person performing an annual or 100-hour inspection shall inspect (where applicable) the following components of the fuselage and hull group:
  - (1) Fabric and skin—for deterioration, distortion, other evidence of failure, and defective or insecure attachment of fittings.
  - (2) Systems and components—for improper installation, apparent defects, and unsatisfactory operation.
  - (3) Envelope, gas bags, ballast tanks, and related parts—for poor condition.
- (c) Each person performing an annual or 100-hour inspection shall inspect (where applicable) the following components of the cabin and cockpit group:
  - (1) Generally—for uncleanliness and loose equipment that might foul the controls.
  - (2) Seats and safety belts—for poor condition and apparent defects.
  - (3) Windows and windshields—for deterioration and breakage.

(4) Instruments—for poor condition, mounting, marking, and (where practicable) improper operation.

(5) Flight and engine controls—for improper installation and improper operation.

(6) Batteries—for improper installation and improper charge.

(7) All systems—for improper installation, poor general condition, apparent and obvious defects, and insecurity of attachment.

(d) Each person performing an annual or 100-hour inspection shall inspect (where applicable) components of the engine and nacelle group as follows:

(1) Engine section—for visual evidence of excessive oil, fuel, or hydraulic leaks, and sources of such leaks.

(2) Studs and nuts—for improper torquing and obvious defects.

(3) Internal engine—for cylinder compression and for metal particles or foreign matter on screens and sump drain plugs. If there is weak cylinder compression, for improper internal condition and improper internal tolerances.

(4) Engine mount - for cracks, looseness of mounting, and looseness of engine to mount.

(5) Flexible vibration dampeners—for poor condition and deterioration.

(6) Engine controls—for defects, improper travel, and improper safetying.

(7) Lines, hoses, and clamps—for leaks, improper condition, and looseness.

(8) Exhaust stacks—for cracks, defects, and improper attachment.

(9) Accessories—for apparent defects in security of mounting.

(10) All systems—for improper installation, poor general condition, defects, and insecure attachment.

(11) Cowling—for cracks, and defects.

(e) Each person performing an annual or 100-hour inspection shall inspect (where applicable) the following components of the landing gear group:

(1) All units—for poor condition and insecurity of attachment.

(2) Shock absorbing devices—for improper oleo fluid level.



(3) Linkages, trusses, and members—for undue or excessive wear fatigue, and distortion.

(4) Retracting and locking mechanism—for improper operation.

(5) Hydraulic lines—for leakage.

(6) Electrical system—for chafing and improper operation of switches.

(7) Wheels—for cracks, defects, and condition of bearings.

(8) Tires—for wear and cuts.

(9) Brakes—for improper adjustment.

(10) Floats and skis—for insecure attachment and obvious or apparent defects.

(f) Each person performing an annual or 100-hour inspection shall inspect (where applicable) all components of the wing and center section assembly for poor general condition, fabric or skin deterioration, distortion, evidence of failure, and insecurity of attachment.

(g) Each person performing an annual or 100-hour inspection shall inspect (where applicable) all components and systems that make up the complete empennage assembly for poor general condition, fabric or skin deterioration, distortion, evidence of failure, insecure attachment, improper component installation, and improper component operation.

(h) Each person performing an annual or 100-hour inspection shall inspect (where applicable) the following components of the propeller group:

(1) Propeller assembly—for cracks, nicks, binds, and oil leakage.

(2) Bolts—for improper torquing and lack of safetying.

(3) Anti-icing devices—for improper operations and obvious defects.

(4) Control mechanisms—for improper operation, insecure mounting, and restricted travel.

(i) Each person performing an annual or 100-hour inspection shall inspect (where applicable) the following components of the radio group:

(1) Radio and electronic equipment—for improper installation and insecure mounting.

(2) Wiring and conduits—for improper routing, insecure mounting, and obvious defects.

(3) Bonding and shielding—for improper installation and poor condition.

(4) Antenna including trailing antenna—for poor condition, insecure mounting, and improper operation.

(j) Each person performing an annual or 100-hour inspection shall inspect (where applicable) each installed miscellaneous item that is not otherwise covered by this listing for improper installation and improper operation.

**SAMPLE CHECKLIST FOR A CONDITION INSPECTION  
AC90-89 APPENDIX 1**

AIRCRAFT IDENTIFICATION:

TYPE/SN \_\_\_\_\_

ENGINE MODEL/SN \_\_\_\_\_

“N” NUMBER \_\_\_\_\_

PROPELLER MODEL/SN \_\_\_\_\_

A/F TOTAL TIME \_\_\_\_\_

ENGINE TOTAL TIME \_\_\_\_\_

OWNER \_\_\_\_\_

PROPELLER TOTAL TIME \_\_\_\_\_

<b>GENERAL:</b>	<b>BUILDER</b>		<b>INSPECTOR</b>	
	Sat	Unsat	Sat	Unsat
REGISTRATION/AIRWORTHINESS/OPERATING LIMITATIONS				
AIRCRAFT IDENTIFICATION PLATES INSTALLED				
EXPERIMENTAL PLACARD INSTALLED				
WEIGHT AND BALANCE/EQUIPMENT LIST				
<b>WINGS:</b>				
REMOVE INSPECTION PLATES/FAIRINGS				
GENERAL INSPECTION OF THE EXTERIOR/INTERIOR WING				
FLIGHT CONTROLS BALANCE WEIGHT FOR SECURITY				
FLIGHT CONTROLS PROPER ATTACHMENT (NO SLOP)				
FLIGHT CONTROL HINGES/ROD END BEARINGS SERVICEABILITY				
FLIGHT CONTROLS PROPERLY RIGGED/PROPER TENSION				
INSPECT ALL CONTROL STOPS FOR SECURITY				
TRIM CONTROL PROPERLY RIGGED				
TRIM CONTROL SURFACES/HINGES/ROD END BEARINGS SERVICE				
FRAYED CABLES OR CRACKED/FROZEN PULLEYS				
SKIN PANELS DELAMINATE/VOIDS (COIN TEST)				
POPPED RIVETS/CRACKED/DEFORMED SKIN				
FABRIC/RIB STITCHING/TAPE CONDITION				
LUBRICATION				

WING ATTACH POINTS				
FLYING/LANDING WIRES/STRUTS FOR SECURITY				
CORROSION				
FLIGHT CONTROL PLACARDS				
INSPECT FIREWALL FOR DISTORTION AND CRACKS				
INSPECT RUDDER PEDALS AND BRAKES FOR OPERATION AND SECURITY				
INSPECT BEHIND FIREWALL FOR LOOSE WIRES AND CHAFFING LINES				
CHECK CONTROL STICK/YOKE FOR FREEDOM OF MOVEMENT				
CHECK FLAP CONTROL OPERATION				
CHECK CABLE AND PULLEYS FOR ATTACHMENT AND OPERATION				
PERFORM FLOODLIGHT CARBON MONOXIDE TEST				
ENSURE THE COCKPIT INSTRUMENTS ARE PROPERLY MARKED				
INSPECT INSTRUMENTS, LINES, FOR SECURITY CHECK/CLEAN/REPLACE INSTRUMENT FILTER				
INSPECT COCKPIT FRESH AIR VENTS/HEATER VENTS FOR OPERATION AND SECURITY				
INSPECT SEATS, SEAT BELTS/SHOULDER HARNESS FOR SECURITY AND ATTACHMENT				
CORROSION				
<b>EMPENNAGE/CANARD:</b>				
REMOVE INSPECTION PLATES AND FAIRINGS				
INSPECT CANARD ATTACH POINTS FOR SECURITY				
INSPECT VERTICAL FIN ATTACH POINTS				
INSPECT ELEVATOR/STABILIZER ATTACH POINTS				
INSPECT HINGES/TRIM TABS/ROD ENDS FOR ATTACHMENT AND FREE PLAY (SLOP)				
INSPECT EMPENNAGE/CANARD SKIN FOR DAMAGE/CORROSION				
INSPECT ALL CONTROL CABLES, HINGES AND PULLEYS				
INSPECT ALL CONTROL STOPS				

<b>ENGINE:</b>				
PERFORM COMPRESSION TEST #1 _____ #2 _____ #3 _____ #4 #5 _____ #6				
CHANGE OIL AND FILTER (CHECK FOR METAL)				
INSPECT IGNITION HARNESS FOR CONDITION AND CONTINUITY				
CHECK IGNITION LEAD CIGARETTES FOR CONDITION/CRACKS				
CLEAN AND GAP SPARK PLUGS				
CHECK MAGNETO TIMING/POINTS/OIL SEAL/DISTRIBUTOR				
INSPECT ENGINE MOUNT/BUSHINGS				
CHECK LANDING LIGHT OPERATION				
CHECK POSITION LIGHTS OPERATION				
CHECK ANTI-COLLISION LIGHT FOR OPERATION				
INSPECT ALL ANTENNA MOUNTS AND WIRING FOR SECURITY				
CHECK ALL GROUNDING WIRES (ENGINE TO AIRFRAME, WING TO AILERON/FLAP, ETC)				
INSPECT RADIOS/LEADS/WIRES FOR ATTACHMENT & SECURITY				
INSPECT CIRCUIT BREAKERS/FUSES/PANEL FOR CONDITION				
<b>OPERATIONAL INSPECTION:</b>				
VISUAL INSPECTION OF THE ENGINE/PROPELLER				
ALL INSPECTION PANELS AND FAIRINGS SECURE				
PERSONNEL WITH FIRE BOTTLE STANDING BY				
BRAKE SYSTEM CHECK				
PROPER FUEL IN TANKS				
ENGINE START PROCEDURES				
OIL PRESSURE/OIL TEMPERATURE WITHIN LIMITS				
VACUUM GAUGE CHECK				
MAGNETO CHECK/HOT MAG CHECK				
IDLE RPM/MIXTURE CHECK				
STATIC RPM CHECK				

ELECTRICAL SYSTEM CHECK				
COOL DOWN PERIOD/ENGINE SHUT DOWN				
PERFORM OIL, HYDRAULIC, AND FUEL LEAK CHECK				
<b>PAPERWORK:</b>				
AIRWORTHINESS DIRECTIVES				
RECORD FINDINGS AND SIGN OFF INSPECTION AND MAINTENANCE IN LOGBOOKS				

## NUMBERING AND PLACARDS

### WHAT ARE THE SPECIAL REQUIREMENTS AS FAR AS ATTACHING NUMBERS AND PLACARDS TO HOMEBUILT AIRCRAFT?

#### **DISPLAY OF MARKS (Reference is FAR Part 45.23)**

After you obtain the registration of your aircraft, the Registration numbers or marks must be affixed to the aircraft in some permanent fashion. The marks must be legible and have no ornamentation. They must contrast in color with the background.

The marks displayed on the aircraft shall include the letter "N" signifying U.S. Registry, followed by the registration number issued for the aircraft.

In addition, amateur-built (Experimental) aircraft must have displayed on that aircraft near each entrance to the cabin or cockpit, in letters not less than 2" not more than 6" in height, the word, "EXPERIMENTAL".

#### **LOCATION OF MARKS ON FIXED WING AIRCRAFT (Reference is FAR Part 45.25)**

(b) (1) If displayed on the vertical tail surfaces, horizontally on both surfaces, horizontally on both surfaces of a single vertical tail or on the outer surfaces of a multi-vertical tail. However, an aircraft on which marks at least 3" high may be displayed and in accordance with 45.29 (b)(1), the marks may be displayed vertically on the vertical tail surface.

(2) If displayed on the fuselage surfaces, horizontally on both sides of the fuselage between the trailing edge of the wing and the leading edge of the horizontal stabilizer. However, if engine pods or other appurtenances are located in this area and are an integral part of the fuselage side surfaces, the operator may place the marks on those pods or appurtenances.

#### **SIZE OF MARKS**

FAR 45.29 (b) (1) (iii) states "Marks at least 3" high may be displayed on an aircraft for which an experimental certificate has been issued under 21.191 (d) or 21.191 (g) for operating as an exhibition aircraft or as an amateur-built aircraft when the maximum cruising speed of the aircraft does not exceed 180 knots Calibrated Air Speed (CAS). And (c) characters must be two-thirds as wide as they are high except "1" which must be one-sixth as wide as it is high and the letters "M" and "W" which may be as wide as they are high. And (d), Characters must be formed by solid lines one-sixth as thick as the character is high. (e) Spacing. The space between each character may not be less than one-fourth of the character width.

**IDENTIFICATION PLATE  
(Reference is FAR Part 45.11)**

In addition to affixing the aircraft's registration number to the sides of the fuselage, the builder must also identify his aircraft by attaching an identification plate to the aircraft's structure.

This identification data required to be inscribed on the plate for amateur-built aircraft shall include the following information:

- a. Builder's name and address
- b. Model designation
- c. Builder's serial number

The identification plate containing these essential elements must be of fireproof material and must be secured in such a manner that it will not likely be defaced or removed during normal service, or lost or destroyed in an accident. It must be secured to the aircraft at an accessible location near an entrance, except that if it is legible to a person on the ground it may be located externally on the fuselage near the tail surfaces.

The identification plate information must be marked thereon by etching, stamping, engraving, or other acceptable fireproof marking.

Metal plates which comply with these requirements may be purchased from the Experimental Aircraft Association for a very nominal fee.



## AIRCRAFT INSTRUMENT MARKINGS & COCKPIT PLACARDS

Your reference is FAR Part 91.9 Civil Aircraft Operating Limitations and Marking Requirements

### GENERAL

To insure that each person operating an aircraft does so within the operating limitations prescribed for it, the FAA requires that there is available in it a current Flight Manual, appropriate instrument marking and placards, **or any combination thereof**.

The purpose of the flight manual, markings and placards is to detail for the operator of the aircraft, the operational limitations prescribed for the aircraft.

In lieu of a flight manual, most amateur builders prefer to mark their instruments and to affix the necessary placards to the instrument panel as the primary means for complying with these requirements.

### MARKINGS AND PLACARDS

The markings and placards necessary for the safe operation and handling of the aircraft should be displayed in a conspicuous place and may not be easily erased, disfigured, or obscured. Such placards and markings should include but not necessarily be limited to the following criteria: Special emphasis on fuel system markings are very important; such as fuel valves-on-off fuel octane quantity, unusable fuel, minimum fuel for take-off, minimum fuel for inverted flight, etc.

### POWERPLANT INSTRUMENT MARKINGS

Each required powerplant instrument should be marked to indicate the maximum and, if applicable, minimum safe operating limits with a **red radial line**.

Each normal operating range is to be marked with a **green arc** not extending beyond the maximum and minimum continuous safe operating limits.

Each engine speed range that is restricted because of excessive vibration should be marked with a **red arc**.

## AIRSPEED INSTRUMENT MARKINGS

The airspeed indicator should be marked with a **red radial line** to establish the never-exceed speed. ( $V_{ne}$ ).

The takeoff and any pre-cautionary range should be marked with a **yellow arc**. The normal range is marked with a **green arc**. The flap actuation range is marked with a **white arc**.

## AIRSPEED PLACARDS

There should be an airspeed placard in clear view of the pilot and as close as practicable to the airspeed indicator listing:

The design maneuvering speed.

The maximum landing gear operating speed (if applicable).

The maximum flap extension operating speed (if applicable).

## LANDING GEAR

If a retractable landing gear is used, an indicator should be marked so that the pilot can, at any time, ascertain that the wheels are secured in their extreme positions.

Each emergency control should be **red** and must be marked as to method of operation and identity.

## CONTROL MARKINGS

Each fuel tank selector should be marked to indicate the position corresponding to each tank and to existing cross feed position.

If safe operation requires the use of any tanks in a specific sequence, that sequence must be identified.

## POWERPLANT FUEL CONTROLS

Each fuel tank selector should be marked to indicate the position corresponding to each tank and to existing cross feed position.

If safe operating requires the use of any tanks in a specific sequence, that sequence must be identified.

## **FLIGHT MANEUVER PLACARD**

For non-acrobatic category airplanes, there should be a placard in front of and in clear view of the pilot stating:

**“No acrobatic maneuvers, including spins, approved.”.**

For acrobatic category airplanes, there should be a placard in clear view of the pilot listing the approved acrobatic maneuvers and the recommended entry airspeed for each. If inverted flight maneuvers are not approved, the placard must have a notation to this effect.

## **BAGGAGE PLACARD**

The maximum baggage load permitted should be displayed in a conspicuous place adjacent to the baggage area.

## **PASSENGER WARNING PLACARD**

A placard must be affixed to the aircraft so that it is readily seen in the cockpit. It will state:

**“Passenger Warning - This aircraft is amateur built and does not comply with the Federal Safety Regulations for Standard Aircraft”.**

## **OPERATING LIMITATIONS**

### **MANDATORY TEST FLIGHT PROVING PHASE**

All amateur-built sport aircraft as well as standard aircraft have federally imposed operating limitations.

Upon satisfactory completion of the necessary final FAA Inspection of the aircraft and whatever ground tests may be required, the FAA inspector will issue your amateur-built "Experimental" Airworthiness Certificate.

He will also issue a form letter establishing the operating limitations applicable to your aircraft during its mandatory flight proving period. These Special Airworthiness Experimental Operating Limitations must be displayed in the aircraft at all times.

The operating limitations imposed on the aircraft during its flight proving period will be more stringent than those issued later after mandatory flight testing phase has been completed.

This phase may begin with the issuance of the aircraft's initial airworthiness certificate and the original operating limitations. At this time the FAA inspector will acquaint you with the requirements for a mandatory flight test and proving period. This flying will be confined to an assigned flight area approved by the FAA Inspector.

The presence of the FAA Inspector is not required, by regulation, at the initial flight of the experimental amateur-built aircraft. If time permits, however, it is not unusual for him to attend.

If he deems necessary, the inspector could issue a permit for a single flight within the boundaries of the airport and, upon witnessing the safe completion of the test, issue a further permit for more extended flights within the permissible area.

A tremendous responsibility for the safe operation of the experimental aircraft rests on the FAA Inspector. If the plane has any new and unusual features, he will naturally tend to treat its first flights with care. Also, pilot qualification and skill is a consideration.

### **PURPOSE OF THE FLIGHT TEST PERIOD**

A flight test period is necessary to show to the FAA that the aircraft is controllable throughout its normal range of speeds and throughout all the maneuvers to be executed. It will also serve to prove that the aircraft has no hazardous operating characteristics or design features.

## **DURATION OF MANDATORY FLIGHT TEST PERIOD**

For standard aircraft type engines: When an FAA approved aircraft engine/propeller combination is installed, the flight test period is usually limited to 25 hours of flight time.

For automotive engines, non-FAA approved engines or propellers, or FAA approved engines and propellers where the combination is not approved, an aircraft equipped with such an engine/propeller combination is required to be flown for a longer test period, usually at least 40 hours, to prove its reliability.

***NOTE:*** *It should be understood that the local FAA Inspector has the prime responsibility in determining the extent of the flight test period to be required for your aircraft. He is permitted to exercise considerable discretion in extending or in reducing the number of hours required to be flown during this period.*

## **FLIGHT TEST AREA**

The FAA Inspector will authorize the flight tests to be carried out in a designated and limited test area, usually within a 25 mile radius of the aircraft's base of operations.

He will insure the area selected is not over densely populated areas or in a congested airway.

In assigning the flight test area, the FAA Inspector may modify the size and shape of the area to suit the best purposes of the flight test program. In some locations, particularly around bigger cities where air traffic is heavy, a flight test area may not be practical. The builder must be prepared to except that an approved flight test area may not be the one chosen to him as the most convenient.

## **OTHER LIMITATIONS DURING THE FLIGHT TEST PERIOD**

As a rule, the carrying of passengers or other crew members will not be permitted unless necessary to the safe operation of that aircraft.

## **AIRCRAFT FLIGHT LOG**

During the flight test period, the pilot should record the aircraft flight history in an appropriate log book. This should be in addition to any engine tach, hourmeter, or engine hourmeter that may be installed in the aircraft.

Specifically, the duration of each individual flight should be recorded including the number of landings made.

A full description of any mishaps, however minor, or any experiences not entirely normal that occur during the flight experience period should also be duly recorded.

Although not required, it is strongly recommended that all operating data be recorded flight by flight. Such information as airspeeds, cylinder head temperatures, etc., will be very valuable and may be used to determine or establish the various performance figures and operating characteristics of the aircraft.

Although the FAA Inspector is required by law to apply certain basic restrictions permanently to the amateur-built aircraft he is certificating, he can apply whatever other limitations he deems necessary at his own discretion. Unfortunately, nothing in the regulations states that the initial restrictions are required to be removed after successful completion of the test period....they only may be modified.

After the mandatory flight test period....then what?

## REPAIRMAN'S CERTIFICATION

The Repairman's Certificate is applied for using the application form 8610-2, available from the local FAA offices. You should ask for this when you apply for your final inspection on your aircraft. You should also be familiar with the Appendix D of FAR part 43. (Items included in the Annual Condition Inspection.)

Every twelve calendar months a condition inspection is performed in accordance with Appendix D of FAR part 43. The repairman has to include the aircraft total time in service, the name, the signature, and the certificate type number of the repairman or A & P, who does the examination.

A & P mechanics must do the Annual Condition Inspection for those who are non-builders who own an amateur-built aircraft. On those aircraft where the builder has a Repairman's Certificate, it is recommended that from time to time the Annual Condition Inspection of those aircraft be done by an A & P simply as a check on the builder/repairman's work. One legal representative recommends that every other Annual Condition Inspection for a builder holding a repairman's certificate be done by an A & P mechanic.

## **ROTAX® ENGINE WARRANTY INFORMATION**

NOTE: Most current Warranty information can be found at <http://www.rotax-owner.com>

KODIAK RESEARCH, INC.  
P.O. BOX N7113  
MARLBOROUGH HOUSE, CUMBERLAND ST.  
NASSAU, N.P. BAHAMAS

### 1) **Period**

ROTAX® as a manufacturer, warrants through the authorized ROTAX® distributors **FROM THE DATE OF SALE TO THE FIRST CONSUMER**, every ROTAX® non-certified aircraft engine, sold as **NEW AND UNUSED**, and **delivered by an authorized ROTAX® distributor** for a period of the earliest of:

- ✍ 6 consecutive months for private use owners
- ✍ or 12 consecutive months from date of shipment of the manufacturer
- ✍ or the first 100 operation hours

### 2) **Procedure**

At the time of purchase the Purchaser will choose which service center he wants to use for warranty service. RANS will register with that service center.

### 3) **Warranty after the warranty period**

In case where a new engine is not put into service for some period of time after the end user purchase date, and a service or warranty issue arises, any claim for warranty consideration will be reviewed on a case by case basis. In these circumstances any warranty consideration that may be provided will be done so on a “goodwill” basis only.

In some cases Kodiak Research LTD may require an FAA sign off document or other proof of the first engine operation date to proceed with any “goodwill” warranty claim.



## 01 - GETTING STARTED

GETTING TO KNOW THE RANS S-19 VENTERRA.....	01-1
TYPICAL HARDWARE AND DRILL SIZE TABLE*.....	01-3
PAINT AND CORROSION PROTECTION .....	01-4
PRIMING.....	01-4
PAINTING .....	01-4
S-19 VENTERRA ASSEMBLY FLOW CHART.....	01-5

## GETTING STARTED

### Getting to know the RANS S-19 VENTERRA

What is it?

If you ask the FAA, it is an *Airplane - single engine land*.

If you ask an aeronautical engineer, it is a *fixed-gear low-wing single-engine airplane of aluminum monocoque construction*.

If you ask us, it is the most fun you can have getting from A to B.

Before we start building, let's have a tour of the airplane. I'm sure most everyone building this airplane will be familiar with the terms described here, but some of you may be working through a language barrier or just may need a refresher course.

Get your S-19 Venterra manuals, find the **FIGURES** manual, and refer to **FIGURES 01-01** thru **01-08**.

Well, let's see... You have your shop in order. Your parts are inventoried and stapled up in order. You have talked to your Airworthiness Representative and you know what he expects. You have read through the manual and know what you will need to complete each assembly **NOTE: Some jigs may require some common hardware and you may need to make some wooden blocks to complete some of the assemblies.**

I guess it is time to build something...

If this is your first time building an aluminum airplane you may want to start with a small part like a rudder. **NOTE: The rudder will teach you the techniques required to build the airframe without risking more expensive parts.** The instructions are laid out in three different manuals: **PARTS**, **TEXT**, and **FIGURES**. The purpose in arranging the instructions in three manuals is to allow you to have each manual open to allow you to see all of the information without having to turn many pages. Here are some important points to remember when completing any assembly:

1. Insert each manual type into a separate 3-ring binder. Remember not to mix **PARTS**, **TEXT**, or **FIGURES** together.
2. Open your manuals to the correct pages before starting an assembly.
3. Use your **PARTS** manual to collect all of the parts needed for the assembly and lay them out in front of you on your work surface.
4. Read the **TEXT** and study the **FIGURE** drawings. Try to establish a mental picture of how the assembly goes together.
5. Fit the assembly together. Double-check the orientation of all the parts. Make sure the ribs are facing the right direction etc...
6. Mark all of the parts with reference #'s to insure that the alike parts return to the same place in the assembly after drilling and deburring.

7. Lay a straight edge across the ribs to insure that the ribs will lay flush with the skin. Adjust the rib flanges with padded pliers as necessary.
8. Keep your work area clean and free from shavings. If practical, keep a blowgun handy to keep the work surface free from shavings.
9. Whenever the assembly is moved, measure to insure that the part is still square and level.
10. Whenever possible support the underlying part with a wooden block when drilling. If this is not possible, use very light pressure as not to deform the underlying part.
11. Deburring means to remove the bur from the hole and nothing more. **CAUTION:** Do **NOT** put a chamfer on the hole when deburring, this will weaken the structure and may cause premature failure of the structure.
12. Use the correct rivet! Do **NOT** substitute one rivet for another, even though it may have the same size and grip length.
13. When placing rivets through steel structures, dip the rivet in primer first. This will seal the hole and prevent corrosion.

Don't forget the most important thing when building your aircraft.

# HAVE FUN!

Revel in the knowledge that you will soon be part of a select group of people that have escaped the bounds of earth with little more than their own work and ingenuity.

The following pages have information which will be helpful during assembly.

## Typical Hardware and Drill Size Table\*.

<b>Hardware</b>	<b>Drill Size</b>
40 APR Rivet	#40
AAPQ-41 thru 48	#30
CCPQ-41 thru 48	#30
AAPQ-62 thru 68	#11
CCPQ-62 thru 68	#11
SSPQ-62 thru 68	#11
AVEX 1691-0410	#30
AN3 Bolt	#11
AN4 Bolt	1/4"
AN5 Bolt	5/16"
AN6 Bolt	3/8"
SSPIN 3/16	3/16"
SSPIN 1/4	1/4"
#4 MACHINE SCREW	#30
#8 MACHINE SCREW	#21
#10 MACHINE SCREW	#11
3/16" Close Tolerance Bolt	.1885 Ream
1/4" Close Tolerance Bolt	.249 Ream
5/16" Close Tolerance Bolt	.3115 Ream
3/8" Close Tolerance Bolt	.375 Ream

\* Use this list only when no other reference is available.

## PAINT AND CORROSION PROTECTION

Painting of the S-19 Venterra is optional, but priming the steel parts of the airplane is mandatory. The information given below is only one example of how an airplane can be painted. There are many ways to do this and this may not represent the best method for your situation or climate.

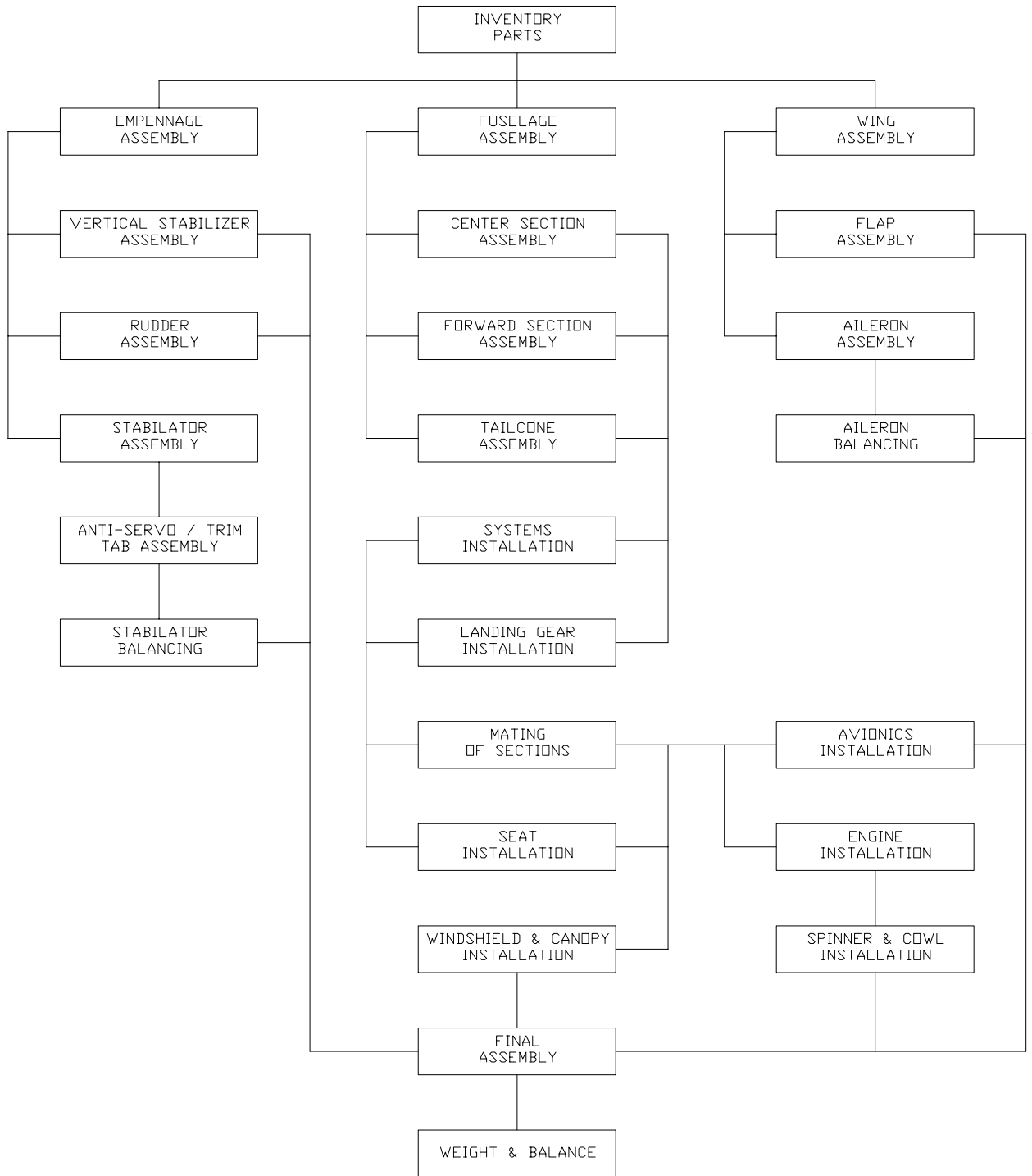
### PRIMING

- Wipe all parts down with acetone before painting
  - Become familiar with all aspects of your paint system. If you don't feel comfortable painting your airplane, seek professional help.
  - Gather all of the steel parts of the airplane immediately when you get your kit and prime them all using zinc chromate primer.
  - Wear rubber gloves and lung protection when performing the following.
1. Clean the parts with acetone.
  2. Scuff the surface of the parts using fine sandpaper or Scotch-Brite pads.
  3. Hang the parts from a simple scaffold using wire.
  4. Apply the paint in several light coats, allowing drying between coats.
  5. Let the parts cure completely before handling. **NOTE:** *After the parts are fit and drilled it will be necessary to reapply primer before final assembly.*

### PAINTING

- Wipe all parts down with acetone before painting
  - Become familiar with all aspects of your paint system. If you don't feel comfortable painting your airplane, seek professional help.
  - Gather all of the steel parts of the airplane immediately when you get your kit and prime them all using zinc chromate primer.
  - Wear rubber gloves and lung protection when performing the following.
1. Clean the surface of the aircraft with acetone.
  2. Scuff the surface with Scotch-Brite and blow off
  3. Mask off all areas that you don't want paint applied.
  4. Follow the manufacturer's recommendations for the paint system you have chosen.

# S-19 VENTERRA ASSEMBLY FLOW CHART



## 02 - EMPENNAGE (TAIL) GROUP

VERTICAL STABILIZER ASSEMBLY .....	02-1
RUDDER ASSEMBLY .....	02A-1
STABILATOR ASSEMBLY .....	02B-1
ANTI-SERVO / TRIM TAB ASSEMBLY .....	02C-1
STABILATOR BALANCING .....	02D-1

## EMPENNAGE (TAIL) GROUP

### VERTICAL STABILIZER ASSEMBLY

**NOTE:** A 1.25" dia. x 95" long Aluminum (or PVC) Tube will be required for forming the Leading Edges of the Rudder, Flaps & Ailerons.

- Vertical stabilizer assembly must be performed on a flat work surface. Assembly on a warped surface will result in a warped vertical stabilizer
  - Sandbags will be required in parts of the assembly to hold the vertical stabilizer flat to the work surface
  - Wipe all parts down with acetone to remove markings before assembly
  - All parts must have their edges polished smooth before installation to avoid cracking in service.
  - All ribs must be straightened. Use fluting pliers at fluted locations. Check on a flat table. It is also important that the rib flanges are straight. Use padded pliers to flatten flanges if necessary.
1. Position all parts on the table in the order they appear in the **Parts Drawing**. Become familiar with the parts and the way they go together.
  2. Press Flange Bushings into the Vertical Stabilizer - Upper Hinges (KPVS0077). See **FIGURE 02-02**. Press Flange Bushings into Vertical Stabilizer – Lower Hinges (KPVS0076). See **FIGURE 02-02**.
  3. Use clecos to assemble the vertical stabilizer plate, stiffener, and ribs to the front spar. Transfer drill all parts #30.
  4. Place vertical stabilizer rib stiffeners (KPVS0062-L/R) as shown in **Parts Drawing** using a line drawn between the holes on the vertical stabilizer plate as shown in the **FIGURE 02-04**.
  5. Verify the angle between the forward spar and rib #7. This should be 71°. The angles on the parts may need to be adjusted to accomplish this.
  6. Transfer drill #30 and cleco through the stiffener into the spar and rib #7.
  7. Disassemble, debur and reassemble front spar assembly.
  8. Rivet front spar assembly using the **Parts Drawing** as a guide.
  9. Place the rear spar reinforcing angles (KPVS0069-R/L) into the rear spar (KPVS0066) as shown in the **Parts Drawing**. These parts must fit nicely together with no gaps and the angles should be approx. 85°. If needed adjust these angles by clamping the parts to a table and gently moving the leg of the part with padded clamps until the desired angle is achieved.



10. Using cleco clamps secure the parts tightly together. The bottom edge of the spar and the bottom edge of the reinforcing angles should line up together. Transfer drill the parts #40 and cleco.
11. Cleco the vertical stabilizer plate rear spar (KPVS0060), plate reinforcement (KPVS0078), and vertical fin hinges (KPVS0077) to the rear spar. Bolt the hinges together with an AN3 bolt to insure alignment of the two hinge angles while they are being drilled to the spar.
12. Transfer drill all holes #30 except those that attach to ribs.
13. Disassemble, debur and reassemble rear spar assembly.
14. Rivet rear spar assembly using the **Parts Drawing** as a guide.
15. Cleco together the front and rear spar assemblies.
16. Place rib reinforcement (KPVS0079) into rib #1 as shown in **Parts Drawing**. Use cleco clamps to hold it in place and transfer drill #30.
17. Place rib stiffener (KPVS0061) on to rib #6 as shown in **FIGURE 02-17**. Mark the rear spar through the two outboard holes in the rib stiffener and drill these marks #40. Use clecos through these holes to hold the stiffener in place while drilling the rest of the holes #30. Remove #40 clecos and drill #30.
18. Cleco the side skins (KPVS0074) to the rear spar. Transfer drill the skins to the rear spar #30. Mark orientation and place the skins aside, they will be installed in a later step.
19. Disassemble, debur and reassemble vertical stabilizer frame assembly.
20. Rivet vertical stabilizer frame assembly using the **Parts Drawing** as a guide.
21. Check the ribs with a straight edge and adjust the flutes and flanges to allow them to lay flat against the skins and maintain a straight line with the holes provided in the skins.
22. Mark the centerline of the ribs with a fine-tip felt marker.
23. Cleco the frame to the jiggling angles (KPVS0081, KPVS0082) provided. See **FIGURE 02-23**.
24. Take measurements from the center points of the ribs and spars to the table to insure that the part is flat with the table. The angles may be weighted with sandbags to insure that the vertical stabilizer is held tight to the table.
25. Cleco the vertical stabilizer skin stiffeners (KPVS0068) to the side skins (KPVS0074). Transfer drill the skin stiffeners to the side skins #30. See **FIGURE 02-25**. Disassemble, debur and reassemble side skins.
27. Rivet the side skins using the **Parts Drawing** as a guide.
28. With the vertical stabilizer horizontal on the table supported by the jiggling angles, cleco the corresponding top skin into position along the rear spar.

29. Move the front spar until the edge of top rib lines up with the edge of the skin. Check that the bottom edge of the skin has an equal amount of overhang over the bottom rib.
30. Check through the predrilled holes in the skin that the holes are over the lines drawn on the centerlines of the ribs. If this is not the case, use fluting pliers to adjust the ribs until they fall inline with the predrilled holes in the skin.
31. Clamp the skin in place using cleco clamps.
32. Once you are satisfied with the fit of the skin, drill and cleco the skin to the frame #30 through the predrilled holes in the skin. Be sure the frame is held secure to the table during this process. **NOTE:** *If your #30 bit is deforming the rib while drilling, use a #40 bit to pilot the hole first.*
33. Disassemble, deburr, and reassemble.
34. Tape the leading edge of the skin down to the forward spar using masking tape.
35. Flip the vertical stabilizer over and repeat procedure for the opposing skin.
36. Draw a straight line along the length of the forward spar 3/8 in from the forward edge of the spar on both sides of the vertical stabilizer. This line will fall on the side skin and will act as a guide for positioning the forward skin.
37. To avoid dimpling in the forward skin round the edges of the forward ribs with a fine file or sand paper.
38. Line up one edge of the forward skin (KPV50075) with the holes over the line that was drawn over the forward spar. As well as being lined up with the forward spar the skin must be oriented vertically to line up with the top and bottom edges of rear skin.
39. When you are satisfied with the orientation of the skin, use cleco clamps top and bottom to hold the skin in place. Drill the forward skin through the rear skin in to the forward spar #30 and cleco.
40. Turn the vertical stabilizer over.
41. Wrap the forward skin around the ribs securing the skin to the rear skin with strips of strapping tape. Keep adjusting the tape until the holes in the skin over the forward spar are inline with the line previously drawn there and the skins are oriented vertically to line up with the rear skin.
42. When you are satisfied with the orientation of the skin, use cleco clamps top and bottom to hold the skin in place. Drill the forward skin through the rear skin in to the forward spar #30 and cleco.
43. Using a padded rod through the end of the skins, align the forward ribs until the centerline drawn on them is visible through the predrilled holes in the forward skin.
44. When you are satisfied with the orientation of the rib, drill the forward skin through the forward ribs #30 and cleco.
45. Disassemble, debur and reassemble.

46. Using the **Parts Drawing** as a guide, rivet the skins to the vertical stabilizer frame.
47. Trim the vertical stabilizer tip fairing (KPVS0071) to the scribe lines.
48. Position the tip fairing inside the forward skin and over the tip bulkhead.
49. While pushing the rib forward and down against the top rib, drill the skin to the fairing #30 and cleco.
50. Position the tip bulkhead in the fairing until it is 90° from the top rib. Hold in place with cleco clamps.
51. Mark the inside of the fairing along the edge of the tip bulk bulkhead. Trim the fairing along this line to make even with the edge of the tip bulkhead.
52. Measure 0.3" from the rear edge of the fairing and place a vertical line up the sides and across the top of the fairing. Measure 1.25" up the fairing on the sides of the fairing from the top holes in the forward skin, and make a mark where it intersects the vertical line. Also mark where the centerline of the fairing intersects the line on the top of the fairing.
53. Drill these three points #30.
54. Disassemble, debur and reassemble.
55. Rivet together using the rivets called out in the **Parts Drawing**.
56. Remove the jiggling angles and set the vertical stabilizer aside in a safe place for painting and installation in a later step. **IMPORTANT: Do NOT permanently attach the Edge Trim until the Vertical Stabilizer has been fit to the finished Fuselage.**

## RUDDER ASSEMBLY

**NOTE:** A 1.25" dia. x 95" long Aluminum (or PVC) Tube will be required for forming the Leading Edges of the Rudder, Flaps & Ailerons.

- Rudder assembly must be performed on a flat work surface. Assembly on a warped surface will result in a warped rudder
  - Clamps will be required in parts of the assembly to hold the rudder flat to the work surface
  - Wipe all parts down with acetone to remove markings before assembly
  - All parts must have their edges polished smooth before installation to avoid cracking in service.
  - All ribs must be straightened. Use fluting pliers at fluted locations. Check on a flat table. It is also important that the rib flanges are straight. Use padded pliers to flatten flanges if necessary.
1. Position all parts on the table in the order they appear in the **Parts Drawings**. Become familiar with the parts and the way they go together.
  2. Press Flange Bushings into Rudder Hinges and Rudder Torque Tube as shown in **FIGURES 02A-02** and **02A-02A**. **NOTE:** You may wish to final-fit and paint the Rudder Torque Tube before final installing the flange bushing.
  3. Assemble all parts on the RUDDER FRAME ASSEMBLY, except Trailing Edge, using clecos. Refer to **FIGURE 02A-03** for Rudder Spar orientation.
  4. Transfer drill all rivet holes #30 and cleco. Transfer drill hinge holes #11 and cleco.
  5. Disassemble, deburr, and re-assemble.
  6. Assemble frame, except Trailing Edge, using rivets and hardware shown in **Parts Drawing**. Be sure an AN3 bolt will insert through the Flange Bushings after bolting the hinges on.
  7. Mark a centerline on all rib flanges with a fine-tip felt marker.
  8. Setup assembly jig as shown in **FIGURE 02A-08**. Use wood screws to attach Tip Angle Jig to the Rudder Frame.
  10. Assemble frame, including Trailing Edge, in jig as shown in **FIGURE 02A-10**.
  11. Apply tape to the overlapping parts of the trailing edge to hold them straight with each other.
  12. Transfer drill the leading edge of the Trailing Edge #40 and cleco. Then drill #30 and cleco. **NOTE:** If you prefer you may use a 12" long #40 drill bit after the Rudder Skins and Ribs have been clecoed in place.

13. Cut apart and profile the strips of Skin Stiffeners (KPRD0069) per **FIGURE 02A-13**. Cleco to the inside of each Rudder Skin (KPRD0073). Be sure to make a Left and Right skin.
14. Slide the Rudder Skins into the rudder jig on the outer sides of the Rudder Frame. Cleco into place along the Rudder Spar, and 1 side of the Trailing Edge **NOTE: Only 1 side is pilot drilled to allow for proper alignment in jig.**
15. Verify that the marked centerlines on the ribs are visible through the holes in the skins and Trailing Edge. Verify that the jig is aligned properly. Transfer drill #40 the Rudder Skins to the ribs, and un-drilled side of the Trailing Edge.
16. Tape Rudder Strap (KPRD0074) in place. Align the top edge of the strap with the top edge of the rudder skin. Position the aft end of the Rudder Strap under the Rudder Skins. The edge with the holes spaced closest together lays over the Tip Rib.
17. Align the Rudder Strap holes with the centerline on the Tip Rib. Drill #40 and cleco.
18. Mark a centerline on the flanges of the Rudder Closeout Rib (KPRD0076)
19. Tape the Rudder Closeout Rib in place. Align the tip holes of the Rudder Strap with the centerline on the rib. Transfer drill #40 and cleco
20. Transfer drill all holes #30 and cleco.
21. Remove rudder from jig and remove Rudder Skins. Un-cleco Skin Stiffeners from Rudder Skins. **NOTE: Be sure to label each skin Left or Right.**
22. Determine which skin will be the top overlapping skin, on the leading edge and bend the edge slightly using a flanging tool. See **FIGURE 02A-22**.
23. The leading edges of the Rudder Skins must be formed to meet at the leading edge of the Rudder along the pilot holes. Form skins using **FIGURE 02A-23**. Templates on **FIGURE 02A-23A** should be used to check for proper shape. **HINT: Glue page to poster board and cut out the templates.** Cleco skins together on Rudder Frame and check fit. Transfer drill #30 and Cleco.
24. Un-cleco and deburr frame and skins.
25. Re-assemble Rudder in jig and rivet.
26. Remove from jig and set aside in a safe place for painting and installation in a later step.

### STABILATOR ASSEMBLY

- Stabilator assembly must be performed on a flat work surface. Assembly on a warped surface will result in a warped stabilator
  - Sandbags will be required in parts of the assembly to hold the stabilator flat to the work surface
  - Wipe all parts down with acetone to remove markings before assembly
  - All parts must have their edges polished smooth before installation to avoid cracking in service.
  - All ribs must be straightened. Use fluting pliers at fluted locations. Check on a flat table. It is also important that the rib flanges are straight. Use padded pliers to flatten flanges if necessary.
1. Position all parts on the table in the order they appear in the **Parts Drawings**. Become familiar with the parts and the way they go together.
  2. Straighten Stabilator Ribs #1 (KPHS0079) and Stabilator Ribs #2 & #3 (KPHS0051) before assembly.
  3. All ribs and Stabilator Spar (KPHS0042) must have lines drawn on their flanges. Mark the line 0.3" from the edge of each flange. These lines will be used for reference when the skins are being attached.
  4. Use a fine-tooth file to round the edge of the Stabilator Spar - Bars (KPHS0044). Round the edge to fit within the bend of the Stabilator Spar Angles (KPHS0043). See **FIGURE 02B-04**.
  5. Place the Stabilator Spar Angles centered in the Stabilator Spar (KPHS0042). Orient the angle so the center-hole cutouts are centered on the Spar's center hole. **HINT: If needed, use a 1 1/8" dowel or tube to help center the cutouts with the spar hole.** The angle's flanges should be tight against the spar's flanges. Cleco clamp the angles in place and transfer drill #40.
  6. On a flat table assemble stabilator frame using #40 clecos. Transfer drill all holes #30 and Cleco. Refer to **FIGURE 02B-06** for Stabilator Spar orientation.
  7. Transfer drill bolt holes in hinge angles to #11. See **FIGURE 02B-07**. **NOTE: Drill only the holes for the bolts to #11.** Remove hinge angles and set aside for installation in a later step.
  8. Assemble stabilator jig assy. as shown in **FIGURE 02B-08**. Then assemble frame to jig as shown in **FIGURES 02B-08A thru 08C**. Aft tooling holes in end ribs will need to be drilled to accommodate jig.
  9. Apply double-sided tape to Stabilator Spar Bars (KPHS0044) and slide into position before bolting on the end jigs. This will help hold the bars in place during construction.

10. The rear spar of the stabilator will need to be supported at the outboard ends of the spar. Cut 2 wooden blocks the appropriate height to support the ends of the spar when resting on the table. Verify that the rear spar is straight by pulling a string line across the ends of the jig and aligning the spar to it.
11. The bend on the trailing edge of the Rear Stabilator Skin must be flattened out to match the profile of the ribs. Use a long board and clecos as shown in **FIGURE 02B-11** to accomplish this.
12. The Stabilator Spar Bar must be held in position during building of the stabilator. This is done by inserting special spacers (included with the stabilator jig) between the spar bars and holding them in place. The edges of these spacers will need to be beveled to match the angle of the spar bars precisely. Secure them each with a few pieces of masking tape and a 3/8" shim. See **FIGURE 02B-08C** for more information.
13. Modify Stabilator Plates (KPHS0061 and KPHS0062-L/R) using **FIGURE 02B-13**.
14. Cleco Top Stabilator Plate in place on center section of Stabilator.
15. Cleco the Skin Stiffeners (KPHS0065 and KPHS0069) in place on the AFT Stabilizer Skins (KPHS0064).
16. Cleco AFT Stabilator Skins in place along the Rear Spar of the stabilator. Slip Bottom Stabilator Plates between Skin and center section and cleco.
17. Verify that the jig is on a level surface and place the blocks, cut in STEP #10, in place under the ends of the rear spar.
18. Secure the front of the AFT Skins to the Stabilator Spar using masking tape.
19. Transfer drill #40 and cleco the skins to the ribs. **NOTE: Be sure the holes are aligned on the marked lines.** Flip the stabilator over and repeat on the other side. (You will need a friend to help you flip it over.) Be sure to re-insert blocks under rear spar. Check alignment of all parts before drilling.
20. Transfer the line on each spar flange to the AFT Skins so they can be visible through the holes in the forward skins.
21. Align the holes in the trailing edge of a forward skin in place along the line drawn on the rear skin. Clamp and tape the skin in place as needed. Transfer drill #40 and cleco through the skins and into the spar. Repeat on the other skin.
22. Drill and cleco #40 the skins to the ribs. Flip the stabilator over. (You will need a friend to help you flip it over.) Be sure to re-insert blocks under rear spar. Check alignment of all parts before drilling.
23. Use several long strips of 2" reinforced strapping tape to pull the skin into position on the opposite side. Align the holes in the trailing edge of a forward skin in place along the line drawn on the rear skin. Drill and cleco #40 through the skins and into the spar. Repeat on the other skin.
24. Working forward from the spar, transfer drill #40 and cleco the skins to the ribs.

25. Cut hinges to length and mark a center-line on the flange. See **FIGURE 02B-25**. Position the hinges and hinge doublers in the rear spar. (Make sure the center-line is visible through the holes in the spar.) Drill and cleco #40.
26. Place Stabilator Channel (KPHS0057) in between Actuator Horns (KPHS0056). Position in a manner that the pilot hole in the channel is aligned with the line drawn on the spar. See **FIGURE 02B-26** for details. Drill and cleco #40.
27. Drill and cleco all holes #30 except for #40 holes on outboard edges of skins. **IMPORTANT:** Do **NOT** drill holes on outboard edges of skin #30. These will be used to install Stabilator Tips in a later step. Center section of jig may be removed to finish drilling the parts together.
28. Place reference marks using a fine-tip felt marker on all the parts where the parts meet each other. This will insure that the parts are re-assembled in the correct position.
29. Disassemble and debur.
30. Clean the parts using acetone. Be careful not to remove reference marks.
31. Re-assemble frame in the jig side plates using clecos. The center section of the jig will no longer be needed. Use the spacer blocks under the rear spar to keep it from sagging.
32. Rivet together Stabilator Frame as shown in the **Parts Drawing**. **IMPORTANT:** Do **NOT** bolt in the Balance Arm (KPHS0060) at this time. The part is much easier to handle without the Balance Arm installed. **HINT:** Position the Balance Arm flush with the aft end of the Aft Rear Balance Tube Attach (KPHS0059). Be sure the arm is upward and 90 degrees to the spar. Transfer drill #11 through both Tube Attach.
33. Install Hinge Angles.
34. Cleco the skins, plates, hinge, and channel in place on the Stabilizer Frame. **IMPORTANT:** Be sure that the Spar Bars are in place in the Spar. Verify that the bar is in place in the spar through the center section of the stabilator and cleco in the middle. Place a cleco in every hole in the spar working outboard from the middle. This will insure that the spar bar is positioned correctly.
35. Turn the Stabilator over and repeat clecoing on the other side
36. Working outboard from the middle, rivet the skins and plates to the Spar using the rivet schedule as a guide. See **FIGURE 02B-36**.
37. Rivet the skins to the ribs and rear spar using a fan pattern from the spar at the center section working outboard. Do not rivet the skins to the outboard rear rib. This rib must be removed to allow it to be separated from the jig.
38. Turn the Stabilator over and repeat riveting on the other side.
39. Move the Stabilator to a pair of padded sawhorses to remove the end jigs. **IMPORTANT:** Position the sawhorses under the ribs to avoid doing damage to the skins.



40. Remove the clecos from the end rib and the Spar Attach Angle. Be careful to have the jig supported while removing the clecos as not to damage the skins.
41. Remove the rib from the end jig.
42. Rivet the rib in place using the rivet schedule and parts page as a guide. Rivet the rib to the spar first. If necessary install the rivets from the back to the front to allow for clearance of the riveter.
43. Trim the Stabilator Tip (KPHS0062) to the trim line molded in to the part. Notch the edge to fit around the spar end allowing the tip to rest against the ribs.
44. Fill the tip with wadded up newspaper to provide stability to the tip during drilling.
45. Pull the tip forward into the leading edge by applying masking tape to the tip on a bias and pulling the tape tight before applying the other end to the stabilator. See **FIGURE 02B-45** for more information.
46. Drill #40. Cleco as you drill. Remove newspaper.
47. Before riveting it may be desirable to reinforce the tip using 1/4" Dow Bluecor™ Polystyrene sheet or similar product. **NOTE: This step is optional.** Using the tip of stabilator as a template, cut a rib that will fit in the stabilator tip longitudinally. You will also need two ribs that will intersect the first rib and be positioned laterally. The outboard facing ribs should be evenly spaced and the longitudinal rib should be aligned with the outer edge of the skin. See **FIGURE 02B-47**.
48. When these parts are fitted, epoxy in to place using 5-minute epoxy.
49. Use double stick tape to hold the stiffener strips in place and cleco the tip to the stabilator.
50. Rivet tip in place.
51. Repeat procedure on other tip.
52. Deburr and install Stabilator Balance Arm (KPHS0060).
53. Balance Stabilator per **SECTION 02D**.

### ANTI-SERVO / TRIM TAB ASSEMBLY

- Anti-servo/trim tab assembly must be performed on a flat work surface. Assembly on a warped surface will result in a warped anti-servo/trim tab
  - Sandbags will be required in parts of the assembly to hold the anti-servo/trim tab flat to the work surface
  - Wipe all parts down with acetone to remove markings before assembly
  - All parts must have their edges polished smooth before installation to avoid cracking in service.
  - All anti-servo/trim tab ribs must be straightened. Check on flat table. It is also important that the rib flanges are straight. Use padded pliers to flatten flanges if necessary.
1. Position all parts on the table in the order they appear in the **Parts Drawings**. Become familiar with the parts and the way they go together.
  2. All ribs must have lines drawn on their flanges 0.3" from the edges of the flanges. These will be used for reference when the skins are being attached.
  3. Locate the center ribs and center spacers and cleco together. **NOTE: Center spacer must be modified, see FIGURE 02C-03.**
  4. Drill #30, deburr, and rivet.
  5. Locate the hinges that were cut during the stabilator assembly.
  6. Cleco the anti-servo/trim tab spar together with the hinge supports.
  7. Pin the hinges in place on the stabilator.
  8. Slide the anti-servo/trim tab spar in place over the hinges and transfer drill #40. **IMPORTANT: Make sure that the spar is centered and the cutouts on the hinge line up with the edge of the spar before drilling.**
  9. Cleco the anti-servo/trim tab together and place on 3 identical blocks (one near the center and one on each end). *The purpose of the blocks is to align the tab with the table and give clearance for the clecos, see FIGURE 02C-09.*
  10. Place sandbags on top of the tab at the blocks to hold the tab securely to the blocks. Transfer drill #30 and cleco (*except for the location of the nutplates*).
  11. Align the ribs with the holes in the skin using the lines drawn on the ribs earlier and transfer drill #30.
  12. Drill the nut plate screw holes in the skin, spacer, and in the center ribs #21
  13. Flip tab over and repeat procedure.
  14. Disassemble and debur.
  15. Install nutplates to skin and center ribs before spar is installed.

16. Cleco assembly together and place back on blocks and rivet.
17. Bend hinge pins and cut as shown in **FIGURE 02C-17**.
18. Drill stabilator rear spar and secure pin with safety wire as shown in **FIGURE 02C-18**.

### **STABILATOR BALANCING**

- Stabilator balancing must be performed on a flat work surface.
- Stabilator and Anti-Servo / Trim Tab must be final painted.
- Anti-Servo / Trim Tab must be installed onto Stabilator.

### **WARNING! LEAD POISONING HAZARD**

**This aircraft contains Inorganic Lead which is for industrial and commercial use only. Misuse of this product will present a health hazard. Dust or fume created from handling or processing this product may be harmful if inhaled or swallowed. Chronic overexposure to dust and/or fumes may result in severe damage to blood forming, nervous, urinary, and reproductive systems.**

#### **Precautions:**

- Do **NOT** eat, drink, use tobacco products, or apply cosmetics in work areas.
- Wash / shower thoroughly after handling and before eating, drinking, or using tobacco products.
- Dispose of water in compliance with Federal, State, and Local Regulations.
- Do **NOT** reuse empty containers.
- Avoid Dust / Fume Inhalation, swallowing of dust and contact with skin and eyes.
- Keep containers and material free of moisture

***CAUTION: Wear rubber gloves and a particle mask when working with Lead. Lead is a heavy metal and is dangerous for your health. Take care when working with Lead to clean up all shavings and to store Lead products out of reach of children.***

**WARNING:** *This procedure requires you to melt Lead to 600+ degrees and pour it into a mold. Please use the appropriate safety equipment when performing this operation.*

1. Obtain all tools and material needed for Casting Lead Ballast Weights called out in the General Section of the Text Manual.
2. Refer to **FIGURE 02D-02** and build the Mold Box. Screws or clamps can be used to hold the Mold Box together.
3. Build the jig as shown in **FIGURE 02D-02** to hold the Balance Arm in place while casting the balance weight.
4. Suspend the Balance Arm into the balance weight mold as shown in **FIGURE 02D-02**.
5. Measure the appropriate amount of Lead using an accurate scale.
6. Place the Lead in the Crucible on the Hotplate.
7. Melt Lead and stir Flux into the Lead using the manufacturer's recommendations.
8. Spoon off the slag and place in fireproof moisture-free container.
9. Pour Lead into Mold and let stand for 30 min.
10. Disassemble Mold and remove flashing from weight.
11. Set Stabilator, with weighted Balance Arm installed, upside down on a sturdy flat table. Tape Anti-Servo / Trim Tab straight with trailing edge of Stabilator.
12. Clamp 2 wooden blocks with Aluminum angles attached to the table. **NOTE:** *The sharp edge of the angle must be up.* Space them to allow the angles to set on the bolt in each Hinge. See **FIGURE 02D-12**. The angles should be about 1 1/2" to 2" tall. If taller angles are used then the wooden blocks may not be needed.
13. Set the Stabilator with hinge bolts on the angles.
14. Remove material from the Balance Weight until perfect level balance is achieved. If painting the Balance Weight, re-check balance after painting.

## APPENDIX

EF-38E - ENGINEERING DEPT. DRAWING NUMBERING SYSTEM.....	APPENDIX-1
RIVET CROSS REFERENCE LIST .....	APPENDIX-2
AN3 - AN8 AIRFRAME BOLTS.....	APPENDIX-3
AN BOLT GAUGE.....	APPENDIX-4
AFFIDAVIT OF OWNERSHIP .....	APPENDIX-5
ELIGIBILITY STATEMENT .....	APPENDIX-6
APPLICATION FOR U.S. AIRWORTHINESS CERTIFICATE.....	APPENDIX-8

## EF-38E - ENGINEERING DEPT. DRAWING NUMBERING SYSTEM

RANS designates parts by eight variables ( $x^1x^2xx^3xxx^4$ ). This system consists of letters and numbers. The following is the breakdown of this system.

<sup>1</sup> CLASSIFICATION	<sup>2</sup> DWG TYPE	<sup>3</sup> AIRCRAFT SECTION	<sup>4</sup> ID NUMBER
K = KIT	A = ASSEMBLY I = INSTALLATION P = PART S = SUPPLIERS V = VIEW	AC = AIRCRAFT AL = AILERON AV = AVIONICS BS = BRAKE SYSTEM CS = CONTROL SYSTEM CV = COVERING CW = COWLING ES = ELECTRICAL SYSTEM EX = EXHAUST FL = FLAP FS = FUEL SYSTEM FU = FUSELAGE FW = FIREWALL HS = HORIZ. STAB HW = HARDWARE (NOT MS, AN...) IN = INTERIOR IP = INSTRUMENT PANEL MG = MAIN GEAR NG = NOSE GEAR PL = PLACARDS PT = PITOT/STATIC SYSTEM PW = POWER PLANT RD = RUDDER ST = SEAT/HARNESS SY = SYSTEM TG = TAIL GEAR TR = TRIM TAB VS = VERT. STAB. WI = WING WS = WINDSHIELD	0 - 9999

EF-38E

### EXAMPLE : KPWI0001

THIS INDICATES THAT IT IS A

**(K)** = KIT PLANE

**(P)** = PART

**(WI)** = WING SECTION

**(0001)** = THE IDENTIFICATION NUMBER

## RIVET CROSS REFERENCE LIST

DIA.	RANS	POP RIVET				CHERRY Q			
	NO.	NO.	SHEAR	TENSILE	GRIP	NO.	SHEAR	TENSILE	GRIP
3/32 (#41)	40APR1/8	AD32ABS	85	135	.031-.125	--	--	--	--
3/32 (#41)	40APR1/4	AD34ABS	85	135	.126-.250	--	--	--	--
3/32 (#41)	40APR3/8	AD36ABS	85	135	.251-.375	--	--	--	--
1/8 (#30)	30APR1/16	--	--	--	--	AAPQ-41	225	250	.0-.062
1/8 (#30)	30APR1/8	AD42ABS	155	235	.063-.125	AAPQ-42	225	250	.063-.125
1/8 (#30)	30APR1/4	AD44ABS	155	235	.188-.250	AAPQ-44	225	250	.126-.250
1/8 (#30)	30APR3/8	AD46ABS	155	235	.313-.375	AAPQ-46	225	250	.251-.375
1/8 (#30)	30SSPR1/16	--	--	--	--	CCPQ-41	700	600	0-.062
1/8 (#30)	30SSPR1/8	SSD42SSBS	550	700	.031-.125	CCPQ-42	700	600	.063-.125
1/8 (#30)	--	--	550	700	--	CCPQ-44	700	600	.126-.250
1/8 (#30)	30SSPR1/4	SSD44SSBS	550	700	.188-.250	CCPQ-45	700	600	.188-.312
1/8 (#30)	30SSPR3/8	SSD46SSBS	550	700	.251-.375	CCPQ-46	700	600	.251-.375
3/16 (#11)	12APR1/8	AD62ABS	315	500	.063-.125	AAPQ-62	500	450	.062-.125
3/16 (#11)	12APR1/4	AD64ABS	315	500	.126-.250	AAPQ-64	500	450	.126-.250
3/16 (#11)	12APR3/8	--	--	--	--	AAPQ-66	500	450	.251-.375
3/16 (#11)	12APR1/2	AD68ABS	315	500	.375-.500	AAPQ-68	500	450	.376-.500
3/16 (#11)	12SSPR1/8	--	--	--	--	CCPQ-62	1650	1300	.062-.125
3/16 (#11)	12SSPR1/4	SSD64SSBS	1000	1375	.126-.250	CCPQ-64	1650	1300	.126-.250
3/16 (#11)	12SSPR3/8	SSD66SSBS	1000	1375	.251-.375	CCPQ-66	1650	1300	.251-.375
3/16 (#11)	--	--	--	--	--	SSPQ-68	1050	825	.376-.50
3/16 (#11)	--	--	--	--	--	SSPQ-610	1050	825	.501-.625
						AVEX RIVET			
1/8 (#30)	--	--	--	--	--	1691-0410	165	230	.031-.187

EF-39G



## AN3 - AN8 AIRFRAME BOLTS

### AN3-AN8 CADMIUM-PLATED STEEL BOLTS (DRILLED AND UNDRILLED)

A non-corrosion-resistant steel machine bolt which conforms to Specification MIL-B-6812. Cadmium-plated to Specification QQ-P-416.

Available with or without single hole through shank and/or single hole through head. Examples of part members for a cadmium plated steel bolt having a diameter of 1/4" and nominal length of 1".

- AN4-6            For drilled shank
- AN4-6A        Designates undrilled shank
- AN4H-6        Drilled head, drilled shank
- AN4H-6A      Drilled head, undrilled shank

### NUT AND COTTER PIN SIZES

AN NUMBER	DIAMETER	PLAIN NUT AN NUMBER	CASTLE NUT AN NUMBER	COTTER PIN MS NUMBER
AN3 .....	3/16	AN315-3R	AN310-3	MS24665-132
AN4 .....	1/4	AN315-4R	AN310-4	MS24665-132
AN5 .....	5/16	AN315-5R	AN310-5	MS24665-132
AN6 .....	3/8	AN315-6R	AN310-6	MS24665-283
AN7 .....	7/16	AN315-7R	AN310-7	MS24665-283
AN8 .....	1/2	AN315-8R	AN310-8	MS24665-283

### HOW TO DETERMINE GRIP    For Steel and Aluminum Aircraft Bolts (Subtract Fractions Shown Below From Length of Bolt)

AN 3 to AN 8	AN NUMBER, Diameter, and Threads per Inch	AN3 10 -32	AN4 1/4 -28	AN5 5/16 -24	AN6 3/8 -24	AN7 7/16 -20	AN8 1/2 -20
	Grip = Length Less .....	13/32	15/32*	17/32	41/64	21/32	25/32

\*Formula does not apply for AN4-3. Grip for AN4-3 is 1/16.

### DASH NUMBER -- NOMINAL LENGTH

-3 ... 3/8	-6 ... 3/4	-11 ... 1 1/8	-14 ... 1 1/2	-17 ... 1 7/8	-22 ... 2 1/4	-25 ... 2 5/8
-4 ... 1/2	-7 ... 7/8	-12 ... 1 1/4	-15 ... 1 5/8	-20 ... 2	-23 ... 2 3/8	-26 ... 2 3/4
-5 ... 5/8	-10 ... 1	-13 ... 1 3/8	-16 ... 1 3/4	-21 ... 2 1/8	-24 ... 2 1/2	-27 ... 2 7/8
						-30 ... 3

### PART IDENTIFICATION

Use the above chart to determine lengths of bolts. Diameters are as follows:

AN3 = 3/16"

AN4 = 1/4"

AN5 = 5/16"

AN6 = 3/8"

Use the parts manual for other part identification. The drawings depict a fairly accurate likeness of the real thing. Other parts are labeled by part number. Again, reference the parts manual to confirm part identity.

# AN BOLT GAUGE

- 3	- 3	- 4	- 5	- 5	- 6	- 6	- 7
- 4	- 4	- 5	- 6	- 6	- 7	- 7	- 7
- 5	- 5	- 6	- 7	- 7	- 8	- 8	- 8
- 6	- 6	- 7	- 8	- 8	- 9	- 9	- 9
- 7	- 7	- 8	- 9	- 9	- 10	- 10	- 10
- 10	- 10	- 11	- 12	- 12	- 13	- 13	- 13
- 11	- 11	- 12	- 13	- 13	- 14	- 14	- 14
- 12	- 12	- 13	- 14	- 14	- 15	- 15	- 15
- 13	- 13	- 14	- 15	- 15	- 16	- 16	- 16
- 14	- 14	- 15	- 16	- 16	- 17	- 17	- 17
- 15	- 15	- 16	- 17	- 17	- 18	- 18	- 18
- 16	- 16	- 17	- 18	- 18	- 19	- 19	- 19
- 17	- 17	- 18	- 19	- 19	- 20	- 20	- 20
- 20	- 20	- 21	- 22	- 22	- 23	- 23	- 23
- 21	- 21	- 22	- 23	- 23	- 24	- 24	- 24
- 22	- 22	- 23	- 24	- 24	- 25	- 25	- 25
- 23	- 23	- 24	- 25	- 25	- 26	- 26	- 26
- 24	- 24	- 25	- 26	- 26	- 27	- 27	- 27
- 25	- 25	- 26	- 27	- 27	- 28	- 28	- 28
- 26	- 26	- 27	- 28	- 28	- 29	- 29	- 29
- 27	- 27	- 28	- 29	- 29	- 30	- 30	- 30
- 30	- 30	- 31	- 32	- 32	- 33	- 33	- 33
- 31	- 31	- 32	- 33	- 33	- 34	- 34	- 34
- 32	- 32	- 33	- 34	- 34	- 35	- 35	- 35
- 33	- 33	- 34	- 35	- 35	- 36	- 36	- 36
- 34	- 34	- 35	- 36	- 36	- 37	- 37	- 37
- 35	- 35	- 36	- 37	- 37	- 38	- 38	- 38
- 36	- 36	- 37	- 38	- 38	- 39	- 39	- 39
- 37	- 37	- 38	- 39	- 39	- 40	- 40	- 40
- 40	- 40	- 41	- 42	- 42	- 43	- 43	- 43
- 41	- 41	- 42	- 43	- 43	- 44	- 44	- 44
- 42	- 42	- 43	- 44	- 44	- 45	- 45	- 45
- 43	- 43	- 44	- 45	- 45	- 46	- 46	- 46
- 44	- 44	- 45	- 46	- 46	- 47	- 47	- 47
- 45	- 45	- 46	- 47	- 47	- 48	- 48	- 48
- 46	- 46	- 47	- 48	- 48	- 49	- 49	- 49
- 47	- 47	- 48	- 49	- 49	- 50	- 50	- 50
- 50	- 50	- 50	- 50	- 50	- 50	- 50	- 50
<b>AN3</b>	<b>AN4</b>	<b>AN5</b>	<b>AN6</b>	<b>AN7</b>	<b>AN8</b>	<b>AN9</b>	<b>AN10</b>
<b>3/16"</b>	<b>1/4"</b>	<b>5/16"</b>	<b>3/8"</b>	<b>7/16"</b>	<b>1/2"</b>	<b>9/16"</b>	<b>5/8"</b>

**AFFIDAVIT OF OWNERSHIP - AC FORM 8050-88**

The most current AC8050-88 is available on the FAA website as an interactive PDF file.

**Paperwork Reduction Act Statement:** The information collected on this form is necessary to ensure applicant eligibility. The information is used to determine that the applicant meets the necessary qualifications as owner of an amateur built aircraft. We estimate that it will take approximately 30 minutes to complete the form. The information collection is required to obtain a benefit. The information collected becomes part of the aircraft registration system. Please note that an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. **OMB 2120-0042.**

Comments covering the accuracy of this burden and suggestions for reducing the burden should be directed to the FAA at 800 Independence Avenue SW, Washington, DC 20591. ATTN: Information Collection Clearance Officer, AES-200.

**AFFIDAVIT OF OWNERSHIP FOR AMATEUR-BUILT AND OTHER  
NON-TYPE CERTIFICATED AIRCRAFT**  
**(does not include light-sport)**

U. S. Identification \_\_\_\_\_

Name of Amateur / Non TC'd builder \_\_\_\_\_

Model \_\_\_\_\_ Serial Number \_\_\_\_\_

Class (airplane, rotorcraft, glider, weight shift control, powered-parachute, etc.) \_\_\_\_\_

Type of Engine Installed (reciprocating, turboprop, 2 or 4 cycle, electric, etc.) \_\_\_\_\_

Manufacturer, Model and Serial Number of each Engine Installed \_\_\_\_\_

Number of Engines Installed \_\_\_\_\_

Built for Land or Sea Operation \_\_\_\_\_ Number of Seats \_\_\_\_\_

**MUST CHECK ONE**

More than 50% of the above-described aircraft was built from miscellaneous parts and I am the owner. (This option is for aircraft eligible for amateur-built certification.)

More than 50% of the above-described aircraft was built from a kit (prefabricated parts) and I am the owner. The bill of sale from the kit manufacturer is attached. (This option is for aircraft eligible for amateur-built certification.)

I certify that the above-described aircraft is a newly built non-type certificated aircraft and is not currently registered in another country. (This option is for aircraft eligible for experimental certification other than amateur-built.)

I certify that the above-described aircraft is a previously built (used) non-type certificated aircraft and is not currently registered in another country. (This option is for aircraft eligible for experimental certification other than amateur-built certification.)

- Evidence of ownership from the aircraft builder through any intervening owners is attached (chain of ownership).
- Unable to obtain complete chain of ownership. Statement as to ownership history and whereabouts of aircraft is attached.

Name of Owner: \_\_\_\_\_

Signature of Owner: \_\_\_\_\_ Title of Signer (If Appropriate): \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone: \_\_\_\_\_

Notary Public:

State of: \_\_\_\_\_ County of: \_\_\_\_\_

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_

My Commission Expires: \_\_\_\_\_

\_\_\_\_\_  
(Signature of Notary Public)

**ELIGIBILITY STATEMENT – FAA FORM 8130-12**

The most current FAA FORM 8130-12 is available on the FAA website as an interactive PDF file.



U.S. Department  
of Transportation  
Federal Aviation  
Administration

ELIGIBILITY STATEMENT  
AMATEUR-BUILT AIRCRAFT

Supplemental Information and Instructions

<b>INFORMATION FOR APPLICANT</b>
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**Privacy Act Statement**

Information on FAA Form 8130-12, Eligibility Statement, Amateur-Built Aircraft is solicited under the authority of 49 U.S.C. 44103 as implemented by 14 CFR Part 21. The purpose of this information is for the applicant to certify that the major portion of the aircraft was fabricated and assembled for their own education or recreation. Submission of this data is mandatory and will become part of the Privacy Act system of records DOT/FAA 801, Aircraft Registration System. Incomplete submission may result in delay or denial of your request. Information maintained in the Privacy Act system of records is routinely used to (1) provide aircraft owners and operators information about potential mechanical defects or unsafe conditions of their aircraft in the form of airworthiness directives, (2) locate specific individuals or aircraft for accident investigation, violation, or safety related requirements, (3) prepare an Aircraft Registry in magnetic tape and microfiche form as required by ICAO agreement, containing information on aircraft owners by name, address, United States Registration Number, and type of aircraft, and (4) DOT Prefatory Statement of General Routine Uses.

**Paperwork Reduction Act Statement:**

This information is collected for the purpose of issuing a special airworthiness certificate for the purpose of operating and amateur-built aircraft to any applicant meeting the criteria established in FAA Order 8130-2, Airworthiness Certification of Aircraft and Related Products. The FAA uses the information to maintain and update the current database of aircraft having obtained approved airworthiness certificates. The burden associated with completing FAA Form 8130-12 is 15 minutes. Providing this information is mandatory if an applicant wishes to obtain a special airworthiness certificate for the purpose of operating an amateur-built aircraft. The information is protected under the provisions of the Privacy Act and the Privacy Act system of records DOT/FAA-801, Aircraft Registration System. An agency may not conduct or sponsor and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control number associated with this collection of information is 2120-0018. Comments concerning the accuracy of this burden and suggestions for reducing the burden should be directed to the FAA at 800 Independence Ave. SW Washington, DC 20591, ATTN: Information Collection Clearance Officer, AES-200.

**Tear off this cover sheet before submitting form.**

Form Approved  
OMB NO. 2120-0018  
Exp. 12/31/2010

 US Department of Transportation Federal Aviation Administration	<h3 style="margin: 0;">ELIGIBILITY STATEMENT AMATEUR-BUILT AIRCRAFT</h3>	Instructions: Print or type all information except signature. Submit original to an authorized FAA representative. Applicant completes Section I thru III. Notary Public Completes Section IV.
I. REGISTERED OWNER INFORMATION		
Name(s) _____		
Address(es) _____		
No. & Street	City	State      Zip
Telephone No.(s) (    ) _____ (    ) _____		
Residence	Business	
II. AIRCRAFT INFORMATION		
Model _____		Engine(s) Make _____
Assigned Serial No. _____		Engine(s) Serial No. _____
Registration No. _____		Prop./Rotor(s) Make _____
Aircraft Fabricated:    Plan <input type="checkbox"/> Kit <input type="checkbox"/>		Prop./Rotor(s) Serial No.(s) _____
III. MAJOR PORTION ELIGIBILITY STATEMENT OF APPLICANT		
I certify that the major portion of this aircraft (identified in Section II above) was fabricated and assembled by		
_____		
Names of all builders (Please Print)		
solely for my (our) education or recreation, in accordance with 14 CFR part 21, Certification Procedures for Products and Parts, § 21.191(g), Operating amateur-built aircraft. I have records to support this statement and will make them available to the FAA upon request.		
During the fabrication and assembly of this project, I/ we used the following commercial assistance (mark N/A if no commercial assistance was used):		
_____	_____	_____
Name of company or individual(s)	City & State	Phone
_____	_____	_____
Name of company or individual(s)	City & State	Phone
-NOTICE-		
Whoever in any matter within the jurisdiction of the executive, legislative, or judicial branch of the Government of the United States, knowingly and willfully falsifies, conceals or covers up by any trick, scheme, or device a material fact, or who makes any materially false, fictitious or fraudulent statement or representation, or makes or uses any false writing or document knowing the same to contain any materially false, fictitious or fraudulent statement or entry, shall be fined under this title, imprisoned not more than 5 years or, if the offense involves international or domestic terrorism, imprisoned not more than 8 years, or both.		
(U.S. Code, Title 18, Sec. 1001)		
APPLICANT'S DECLARATION		
I hereby certify that all statements and answers provided by me in this statement form are complete and true to the best of my knowledge, and I agree that they are to be considered part of the basis for issuance of any FAA certificate to me. I have also read and understand the Privacy Act statement that accompanies this form.		
Signature of Applicant ( <i>In Ink</i> ) _____		Date _____
IV. NOTARIZATION STATEMENT		

**APPLICATION FOR U.S. AIRWORTHINESS CERTIFICATE – FAA FORM 8130-6**

The most current FAA FORM 8130-6 is available on the FAA website as an interactive PDF file.



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

<b>INFORMATION FOR APPLICANT</b>
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**APPLICATION FOR U.S. AIRWORTHINESS CERTIFICATE**

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**Privacy Act Statement**

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Information on FAA Form 8130-6, Application for U.S. Airworthiness Certificate is solicited under the authority of 49 U.S.C. 44103 as implemented by 14 CFR Part 21. The purpose of this information is to evaluate an applicant's application for a U.S. Airworthiness Certificate. Submission of this data is mandatory and will become part of the Privacy Act system of records DOT/FAA 801, Aircraft Registration System. Incomplete submission may result in delay or denial of your request. Information maintained in the Privacy Act system of records is routinely used to (1) provide aircraft owners and operators information about potential mechanical defects or unsafe conditions of their aircraft in the form of airworthiness directives, (2) locate specific individuals or aircraft for accident investigation, violation, or safety related requirements, (3) prepare an Aircraft Registry in magnetic tape and microfiche form as required by ICAO agreement, containing information on aircraft owners by name, address, United States Registration Number, and type of aircraft, and (4) DOT Prefatory Statement of General Routine Uses.

**Paperwork Reduction Act Statement:**

This information is collected for the purpose of issuing a U.S. Airworthiness Certificate to any applicant meeting the criteria established in FAA Order 8130.2, Airworthiness Certification of Aircraft and Related Products. The FAA uses the information to maintain and update the current database of aircraft having obtained approved airworthiness certificates. The burden associated with completing FAA Form 8130-6 is 42 minutes. Providing this information is mandatory if an applicant wishes to obtain an airworthiness certificate. The information is protected under the provisions of the Privacy Act and the Privacy Act system of records DOT/FAA-801, Aircraft Registration System. An agency may not conduct or sponsor and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control number associated with this collection of information is 2120-0018. Comments concerning the accuracy of this burden and suggestions for reducing the burden should be directed to the FAA at: 800 Independence Ave. SW, Washington, DC 20591, Attn:Information Collection Clearance Officer, AES-300.

**TEAR OFF THIS COVER SHEET BEFORE SUBMITTING THIS FORM**

FAA FORM 8130-6, APPLICATION FOR U.S. AIRWORTHINESS CERTIFICATE

Form Approved O.M.B. No. 2120-0018  
Expiration Date 06/30/2011

I. AIRCRAFT DESCRIPTION		1. REGISTRATION MARK		2. AIRCRAFT BUILDER'S NAME (Make)		3. AIRCRAFT MODEL DESIGNATION		4. YR. MFR.		FAA CODING			
		5. AIRCRAFT SERIAL NO.		6. ENGINE BUILDER'S NAME (Make)		7. ENGINE MODEL DESIGNATION							
		8. NUMBER OF ENGINES		9. PROPELLER BUILDER'S NAME (Make)		10. PROPELLER MODEL DESIGNATION				11. AIRCRAFT IS (Check if applicable) <input type="checkbox"/> EXPORT <input type="checkbox"/> IMPORT			
APPLICATION IS HEREBY MADE FOR: (Check applicable items)													
A <input type="checkbox"/> 1 STANDARD AIRWORTHINESS CERTIFICATE (Indicate category) <input type="checkbox"/> NORMAL <input type="checkbox"/> UTILITY <input type="checkbox"/> ACROBATIC <input type="checkbox"/> TRANSPORT <input type="checkbox"/> COMMUTER <input type="checkbox"/> BALLOON <input type="checkbox"/> OTHER													
B <input type="checkbox"/> 2 SPECIAL AIRWORTHINESS CERTIFICATE (Check appropriate items)													
7 <input type="checkbox"/> PRIMARY													
9 <input type="checkbox"/> LIGHT-SPORT (Indicate Class) <input type="checkbox"/> Airplane <input type="checkbox"/> Power-Parachute <input type="checkbox"/> Weight-Shift-Control <input type="checkbox"/> Glider <input type="checkbox"/> Lighter than Air													
2 <input type="checkbox"/> LIMITED													
5 <input type="checkbox"/> PROVISIONAL (Indicate class)													
1 <input type="checkbox"/> CLASS I													
2 <input type="checkbox"/> CLASS II													
3 <input type="checkbox"/> RESTRICTED (Indicate operation(s) to be conducted)													
1 <input type="checkbox"/> AGRICULTURE AND PEST CONTROL													
2 <input type="checkbox"/> AERIAL SURVEY													
3 <input type="checkbox"/> AERIAL ADVERTISING													
4 <input type="checkbox"/> FOREST (Wildlife conservation)													
5 <input type="checkbox"/> PATROLLING													
6 <input type="checkbox"/> WEATHER CONTROL													
0 <input type="checkbox"/> OTHER (Specify)													
4 <input type="checkbox"/> EXPERIMENTAL (Indicate operation(s) to be conducted)													
1 <input type="checkbox"/> RESEARCH AND DEVELOPMENT													
2 <input type="checkbox"/> AMATEUR BUILT													
3 <input type="checkbox"/> EXHIBITION													
4 <input type="checkbox"/> AIR RACING													
5 <input type="checkbox"/> CREW TRAINING													
6 <input type="checkbox"/> MARKET SURVEY													
0 <input type="checkbox"/> TO SHOW COMPLIANCE WITH THE CFR													
7 <input type="checkbox"/> OPERATING (Primary Category) KIT BUILT AIRCRAFT													
8 <input type="checkbox"/> OPERATING LIGHT-SPORT													
8A <input type="checkbox"/> Existing aircraft without an airworthiness certificate & do not meet § 103.1													
8B <input type="checkbox"/> Operating Light-Sport Kit-built													
8C <input type="checkbox"/> Operating light-sport previously issued special light-sport category airworthiness certificate under § 21.190													
9 <input type="checkbox"/> UNMANNED AIRCRAFT													
9A <input type="checkbox"/> RESEARCH AND DEVELOPMENT													
9B <input type="checkbox"/> MARKET SURVEY													
9C <input type="checkbox"/> CREW TRAINING													
8 <input type="checkbox"/> SPECIAL FLIGHT PERMIT (Indicate operation to be conducted, then complete Section VI or VII as applicable on reverse side)													
1 <input type="checkbox"/> FERRY FLIGHT FOR REPAIRS, ALTERATIONS, MAINTENANCE, OR STORAGE													
2 <input type="checkbox"/> EVACUATE FROM AREA OF IMPENDING DANGER													
3 <input type="checkbox"/> OPERATION IN EXCESS OF MAXIMUM CERTIFICATED TAKE-OFF WEIGHT													
4 <input type="checkbox"/> DELIVERING OR EXPORTING													
5 <input type="checkbox"/> PRODUCTION FLIGHT TESTING													
6 <input type="checkbox"/> CUSTOMER DEMONSTRATION FLIGHTS													
C <input type="checkbox"/> 6 MULTIPLE AIRWORTHINESS CERTIFICATE (Check ABOVE "Restricted Operation" and "Standard" or "Limited" as applicable)													
A. REGISTERED OWNER (As shown on certificate of aircraft registration)													
NAME						IF DEALER, CHECK HERE ADDRESS							
B. AIRCRAFT CERTIFICATION BASIS (Check applicable blocks and complete items as indicated)													
<input type="checkbox"/> AIRCRAFT SPECIFICATION OR TYPE CERTIFICATE DATA SHEET (Give No. and Revision No.)						<input type="checkbox"/> AIRWORTHINESS DIRECTIVES (Check if all applicable ADs are complied with and give the number of the last AD SUPPLEMENT available in the biweekly series as of the date of application)							
<input type="checkbox"/> AIRCRAFT LISTING (Give page number(s))						<input type="checkbox"/> SUPPLEMENTAL TYPE CERTIFICATE (List number of each STC incorporated)							
C. AIRCRAFT OPERATION AND MAINTENANCE RECORDS													
<input type="checkbox"/> CHECK IF RECORDS IN COMPLIANCE WITH 14 CFR section 91.417						TOTAL AIRFRAME HOURS			<input type="checkbox"/> 3 EXPERIMENTAL ONLY (Enter hours flown since last certificate issued or renewed)				
D. CERTIFICATION - I hereby certify that I am the registered owner (or his agent) of the aircraft described above, that the aircraft is registered with the Federal Aviation Administration in accordance with Title 49 of the United States Code 44101 et seq. and applicable Federal Aviation Regulations, and that the aircraft has been inspected and is airworthy and eligible for the airworthiness certificate requested.													
DATE OF APPLICATION				NAME AND TITLE (Print or type)				SIGNATURE					
IV. INSPECTION AGENCY VERIFICATION													
A. THE AIRCRAFT DESCRIBED ABOVE HAS BEEN INSPECTED AND FOUND AIRWORTHY BY: (Complete the section only if 14 CFR part 21.183(d) applies)													
<input type="checkbox"/> 2		<input type="checkbox"/> 14 CFR part 121 CERTIFICATE HOLDER (Give Certificate No.)				<input type="checkbox"/> 3		<input type="checkbox"/> CERTIFICATED MECHANIC (Give Certificate No.)		<input type="checkbox"/> 6		<input type="checkbox"/> CERTIFICATED REPAIR STATION (Give Certificate No.)	
<input type="checkbox"/> 5		<input type="checkbox"/> AIRCRAFT MANUFACTURER (Give name or firm)											
DATE				TITLE				SIGNATURE					
V. FAA REPRESENTATIVE VERIFICATION													
(Check ALL applicable block items A and B)													
A. I find that the aircraft described in Section I or VII meets requirements for <input type="checkbox"/> 4 THE CERTIFICATE REQUESTED													
B. Inspection for a special flight permit under <input type="checkbox"/> FAA INSPECTOR <input type="checkbox"/> AMENDMENT OR MODIFICATION OF CURRENT AIRWORTHINESS CERTIFICATE													
Section VII was conducted by: <input type="checkbox"/> CERTIFICATE HOLDER UNDER <input type="checkbox"/> 14 CFR part 65 <input type="checkbox"/> 14 CFR part 121 OR 135 <input type="checkbox"/> 14 CFR part 145													
DATE		MIDO/FSDO OFFICE		FAA INSPECTOR'S SIGNATURE OR DESIGNEE'S SIGNATURE AND NO.				FAA INSPECTOR'S CERTIFICATION FILE REVIEW SIGNATURE					
		4						1					

<b>VI. PRODUCTION FLIGHT TESTING</b>	A. MANUFACTURER	
	NAME	ADDRESS
	B. PRODUCTION BASIS <i>(Check applicable item)</i>	
	<input type="checkbox"/>	PRODUCTION CERTIFICATE <i>(Give production certificate number)</i>
	<input type="checkbox"/>	TYPE CERTIFICATE
	OTHER:	
	C. GIVE QUANTITY OF CERTIFICATES REQUIRED FOR OPERATING NEEDS	
	DATE OF APPLICATION	SIGNATURE
	NAME AND TITLE <i>(Print or type)</i>	
<b>VII. SPECIAL FLIGHT PERMIT PURPOSES OTHER THAN PRODUCTION FLIGHT TEST</b>	A. DESCRIPTION OF AIRCRAFT	
	REGISTERED OWNER	ADDRESS
	BUILDER <i>(Make)</i>	MODEL
	SERIAL NUMBER	REGISTRATION MARK
	B. DESCRIPTION OF FLIGHT	
	FROM	CUSTOMER DEMONSTRATION FLIGHTS <input type="checkbox"/> <i>(Check if applicable)</i>
		TO
	VIA	DEPARTURE DATE
		DURATION
	C. CREW REQUIRED TO OPERATE THE AIRCRAFT AND ITS EQUIPMENT	
	<input type="checkbox"/>	PILOT
	<input type="checkbox"/>	CO-PILOT
	<input type="checkbox"/>	FLIGHT ENGINEER
	<input type="checkbox"/>	OTHER <i>(Specify)</i>
	D. THE AIRCRAFT DOES NOT MEET THE APPLICABLE AIRWORTHINESS REQUIREMENTS AS FOLLOWS:	
E. THE FOLLOWING RESTRICTIONS ARE CONSIDERED NECESSARY FOR SAFE OPERATION: <i>(Use attachment if necessary)</i>		
F. CERTIFICATION - I hereby certify that I am the registered owner (or his agent) of the aircraft described above; that the aircraft is registered with the Federal Aviation Administration in accordance with Title 49 of the United States Code 44101 <u>et seq.</u> and applicable Federal Aviation Regulations, and that the aircraft has been inspected and is safe for the flight described.		
DATE	SIGNATURE	
	NAME AND TITLE <i>(Print or type)</i>	
<b>VIII. AIRWORTHINESS DOCUMENTATION (FAA/DESIGNEE use only)</b>	<input type="checkbox"/>	A. Operating Limitations and Markings in Compliance With 14 CFR Section 91.9, As Applicable
	<input type="checkbox"/>	B. Current Operating Limitations Attached
	<input type="checkbox"/>	C. Data, Drawings, Photographs, etc. <i>(Attach when required)</i>
	<input type="checkbox"/>	D. Current Weight and Balance Information Available in Aircraft
	<input type="checkbox"/>	E. Major Repair and Alteration, FAA Form 337 <i>(Attach when required)</i>
	<input type="checkbox"/>	F. This inspection Recorded in Aircraft Records
<input type="checkbox"/>	G. Statement of Conformity, FAA Form 8130-9 <i>(Attach when required)</i>	
<input type="checkbox"/>	H. Foreign Airworthiness Certification for Import Aircraft <i>(Attach when required)</i>	
<input type="checkbox"/>	I. Previous Airworthiness Certificate Issued in Accordance With 14 CFR Section _____ CAR _____ <i>(Original attached)</i>	
<input type="checkbox"/>	J. Current Airworthiness Certificate Issued in Accordance With 14 CFR Section _____ <i>(Copy attached)</i>	
<input type="checkbox"/>	K. Light-Sport Aircraft Statement of Compliance, FAA Form 8130-15 <i>(Attach when required)</i>	