Aircraft Flight Manual

Volmer VJ-22 Sportsman

N38WW
S/N 74555

GENERAL

The Volmer VJ-22 Sportsman is an FAA certificated experimental category amphibious flying boat aircraft. The aircraft has a high wing, mono-hull, twin sponson, and pylon mounted engine configuration. Seating is for two side by side with adequate room for baggage. Landing gear is the conventional type with retractable mains and tailwheel. A steerable tailwheel provides control on the ground and a retractable water rudder aids in steerage while afloat.

Designed by Mr. Volmer Jensen who is known for the construction of the original Starship Enterprise model for the Star Trek TV series. Construction of the original VJ-22 "Chubasco" was started in September of 1957 and was flying in December 1958. Volmer built the aircraft for his own enjoyment and to support his hobby of skin diving, but decided to offer drawings for the aircraft following strong demand. The aircraft was renamed the Volmer VJ-22 Sportsman. It utilizes a hull based on the shape and construction methods of a Savio-Marchetti for strength and good hydrodynamic qualities. The hull construction is rigid and corrosion proof, made of 1/16 inch and 3/32 inch aircraft mahogany plywood with 1/4 inch plywood at the step. The hull is covered with fiberglass for added protection. The wings, wing struts, and horizontal tail are from an Aeronca Champ 7EC. The wood spar wing structure, steel horizontal tail, and all control surfaces are fabric covered.

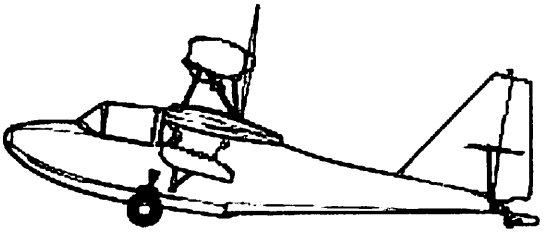
Volmer Jensen thoroughly tested the design from calm water to five foot swells in the open sea and has proven the design to be both airworthy and seaworthy. The pusher engine mount affords excellent visibility from the cockpit and keeps the propeller safely out of the way.

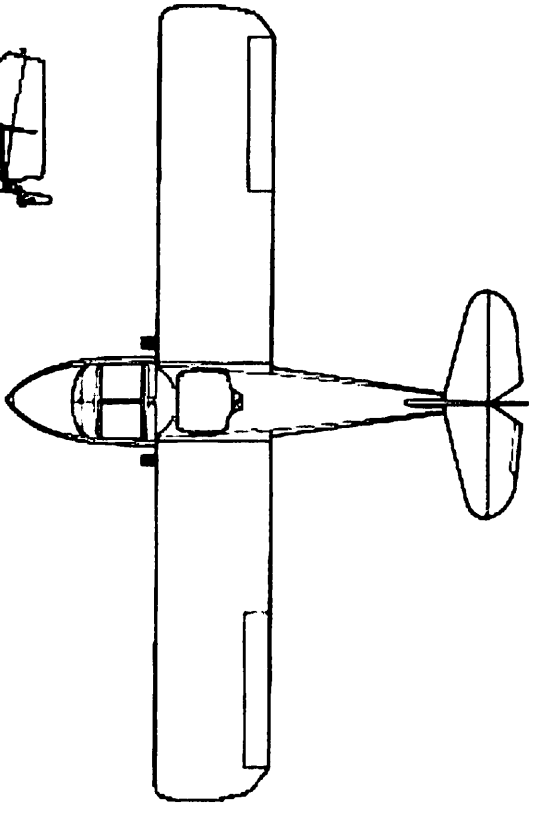
Volmer VJ-22 Sportsman S/N 74555 was manufactured by William Wedlund in Florida and received a Special Airworthiness Certificate on 31 March 1994.

WARNING

Exercise extreme caution when landing on water
Failure to retract the main landing gear during water operations will cause the aircraft to overturn causing substantial damage and injury or death

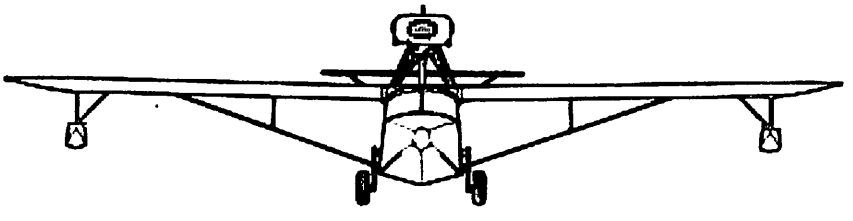
THREE VIEW DRAWING





VOLMER AIRCRAFT'S VJ22 "SPORTSMAN"

Length, 24 feet
Height, 8 feet
Span, 34 feet
Empty-weight, 1,100 pounds
Useful load, 550 pounds
Gross weight, 1,650 pounds
Power, Franklin 0-235
Fuel capacity, 37 gallons
Range, 436 miles
Climb, 600 feet/minute
Cruising speed, 85 mph
Stalling speed, 45 mph
Service ceiling, 15,000 feet



Operating Limitations

Volmer VJ-22 S/N 74555 N38WW

Airframe Limitations

VNE.....105 MPH
Vso..... 30 MPH
Vx.....55 MPH
Vy.....63 MPH
Vortex Generators.....Aircraft Unairworthy if More than 5 Missing or Damaged

Engine Limitations

Maximum RPM (5 Minutes).....2800 RPM
Maximum Continuous RPM..... 2800 RPM
Minimum Idle RPM.....500 RPM
Normal Oil Pressure Operating Range.....50 - 80 PSI
Minimum Oil Pressure (Idle).....25 PSI
Maximum Oil Temperature.....234 F
Fuel Pressure Normal Operating Range at Carb Inlet.....2.2 – 7.3 PSI

Electrical Limitations

Maximum Battery Voltage.....14.4 Volts
Partially Discharged Battery.....Between 6-9 Volts use BMS fast charge
Minimum Battery Voltage.....Discard battery below 6 Volts
Maximum charge amperage (12 Cell Aerovoltz).....20A at 13.2-14.4 volts

Temperature Limitations

Battery Temperature limitations.....0 – 140 Fahrenheit

Weight and Balance Limitations

Maximum Gross Takeoff Weight.....1650 lbs
Maximum Ramp Weight.....1650 lbs
Maximum Landing Weight.....1650 lbs.
Forward CG limit.....11.5" aft of WLE
Aft CG limit.....18" aft of WLE
(Volmer Jensen stated 15" aft WLE preferred aft CG with 18" as limit)

Warning:
Solo operation requires ballast in the nose to keep aircraft within aft CG limit.
Perform weight and balance computation prior to flight

Acceleration Limitations
Maximum Positive G-Loading.....+2.5 g
Maximum Negative G-Loading.....-1.0 g
Note: G-loading limitation is required due to the use of the champ wing at increased gross weight and the wing strut geometry

Wave Height
Recommended Maximum Wave Height.....12 Inches

FAA Experimental Operating Limitations Amateur Built Aircraft N38WW
See Documents for Phase I and Phase II dated Sept 11, 2014 and signed by ASI(AW) Spencer Cull located in appendix A.
Supercedes Documents for Phase I and Phase II dated March 31,1994 and signed by ASI(AW) George T. Erdel located in appendix B.

Phase II Operating Limitations – Pertinent for non-test or non-major change related operations, i.e. Normal Operations

- No person may operate this aircraft for other than the purpose for which the Special Airworthiness Certificate was issued, and the aircraft shall be operated in accordance with the applicable FAA Air Traffic and general operating rules of FAR 91
- Daytime, Nighttime, VFR operation is authorized
- This aircraft shall contain the placards, markings as required by FAR 91.9
- Acrobatic Flight is Prohibited – Including Spins
- This aircraft shall not be operated for glider towing or intentional parachute jumping operations
- Except for takeoff and landings this aircraft shall not be operated over densely populated areas, or in congested airways
- No person shall operate this aircraft unless within the preceding 12 calendar months it has had a condition inspection performed in accordance with Appendix D FAR PART 43 and was found to be in a condition of safe operation. Additionally this inspection shall be recorded in the aircraft maintenance records showing the following statement, "I certify that this aircraft has been inspected on (DATE), in accordance with the scope and detail of Appendix D of Part 43, and found to be in a condition for safe operation." This entry will include the aircraft TTIS, name, signature, and certificate type and number of the person performing the inspection. This person must be an A&P or hold the Airman Repair Certificate

TECHNICAL FACTS

AIRFRAME

The fuselage is constructed of a Douglas fir keel with spruce longerons and formers covered in mahogany plywood of 1/16", 1/8", and ¼" in highly loaded areas. The wings utilize spruce spars and stamped aluminum wing ribs. The horizontal tail is welded steel tube while the vertical tail and ruder are constructed of spruce with a mahogany plywood skin on the fin. Poly Fiber systems polyester Ceconite covering is used on the control surfaces, horizontal stabilizer and wings. The wing struts and engine pylon are welded steel streamlined tubing. The retractable undercarriage is fabricated from 4130 steel and utilizes elastic cord suspension.

Flight controls are manually actuated by cable and pulley. A movable elevator trim tab is installed and cable operated from the cockpit.

Landing gear and water rudder operation is manually actuated by levers and cranks. The main gear is held in the down position by a lever and cable actuated down lock pin on each side. Main gear retraction, once the down locks are unlocked, is achieved by rotating a main gear retract crank with spring assist (Schauss Mod). Once in the up position a length of line is used as an up-lock to prevent the retract crank from rotating. The tail wheel uses two different but collocated levers for extension and retraction. The water rudder extension and retraction is by lever.

The electrical system a conventional 12 volt system with an alternator, modified to external regulation, and a LIFEPO battery. The alternator field fuse, alternator output circuit breaker, and the fuel pump 1 fuse are located behind the pilots head on the aft power distribution panel, while the remainder of the fuses are located behind the primary flight display (IPad) on the forward power distribution fuse block. Fuel pump 1 is powered by the hot battery bus to provide fuel pressure in the event of an alternator or electrical distribution fault. Fuel pump 2 is powered by the forward power distribution fuse block (Main bus) to provide fuel pressure in the event of a battery fault and subsequent isolation. Check valves permit either pump to supply fuel to the carburetor.

WARNING

The fuel pumps (1 and 2) in this aircraft operate solely on electrical power. Battery failure, discharge, or Batt Master off selection with simultaneous alternator failure or Alt Field off selection will result in engine failure.

DIMENSIONS

Length..... 24'
Height..... 8'
Span (Aeronca Champ 7EC wings).....34' (Some VJ-22s use a 36'6 wing)
Wing Area.....160 sq. feet

PERFORMANCE

Cruising speed..... 82 mph
Stalling speed..... 30 mph
Climb rate (Sea level, Standard day, MGTOW)..... 600' per minute.
Ceiling .....13,000'
Maximum range in still air with VFR reserves.....340 statute miles
Fuel Consumption (2600 RPM leaned).....8.5 GPH

ENGINE

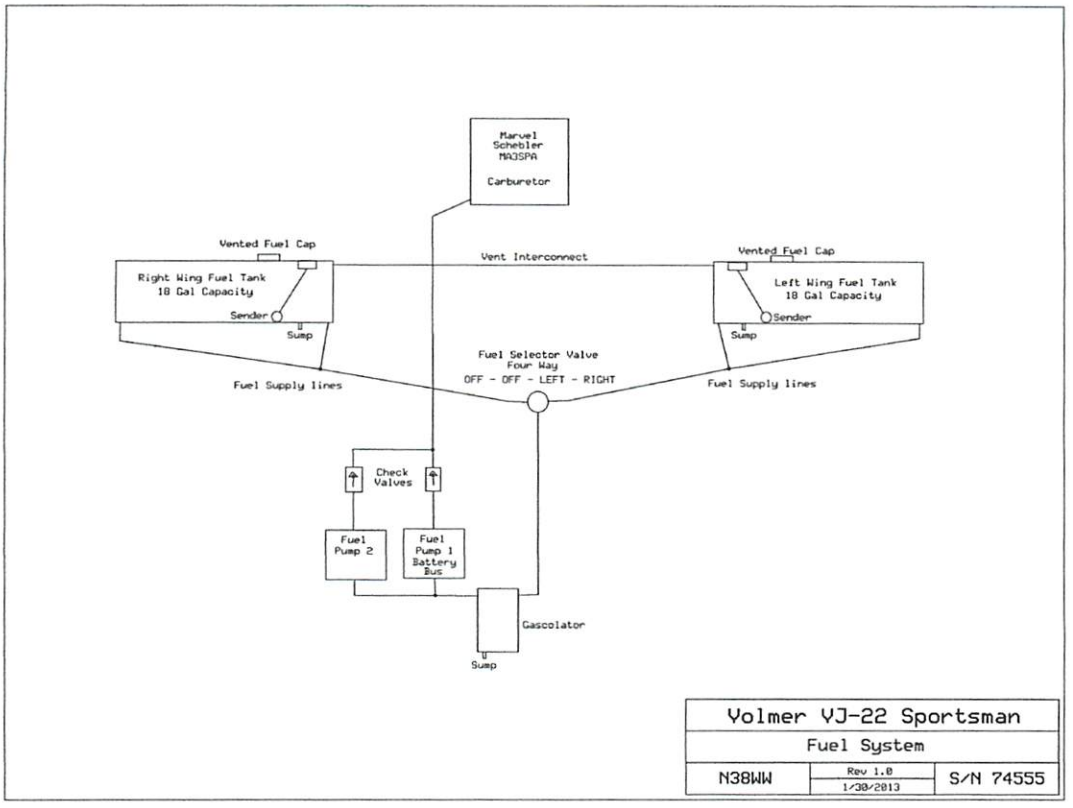
Engine Manufacturer ..... Franklin
Engine Model.....O-235 Sport 4
Fuel System.....Carbureted
Engine Cooling .....Air Cooled with Oil Cooler
Engine Type ..... Horizontally Opposed, Direct Drive
Horsepower Rating.....116 / 120/ 125 HP @ 2800 RPM
Timing per Franklin Manual.....Both Magnetos @ 32 BTDC
Recommended TBO.....1500 Hours
Spark Plugs and Harness.....18 MM - 3/4x20 - RHB 32E / CH12360 – M2360
Spark Plug Torque.....330–360 pound/inches
Firing Order.....1-4-2-3
Valve Rocker Clearance w/ Lifters Bled Down and Engine Cold....0.036" – 0.044"

PROPELLER

Propeller Manufacturer..... Sterba Aircraft Propellers
Blades.....2
Propeller Diameter.....72 inches
Propeller Pitch.....38 inches
Propeller Type .....Wood, Fixed Pitch
Prop Bolt Torque - Dry Bolts – Torque.....15-18 ft-lbs.

FUEL SYSTEM

Total Fuel Capacity..... 37.0 U.S. Gallons
Usable Fuel Capacity ..... 36.4 U.S. Gallons
Approved Fuel Grade.....100LL Grade Aviation Fuel



WARNING

Use of unapproved fuels may result in engine damage or engine failure.

WARNING

The fuel pumps (1 and 2) in this aircraft operate solely on electrical power. Battery failure, battery discharge, or Batt Master off selection with simultaneous alternator failure or Alt Field off selection will result in engine failure.

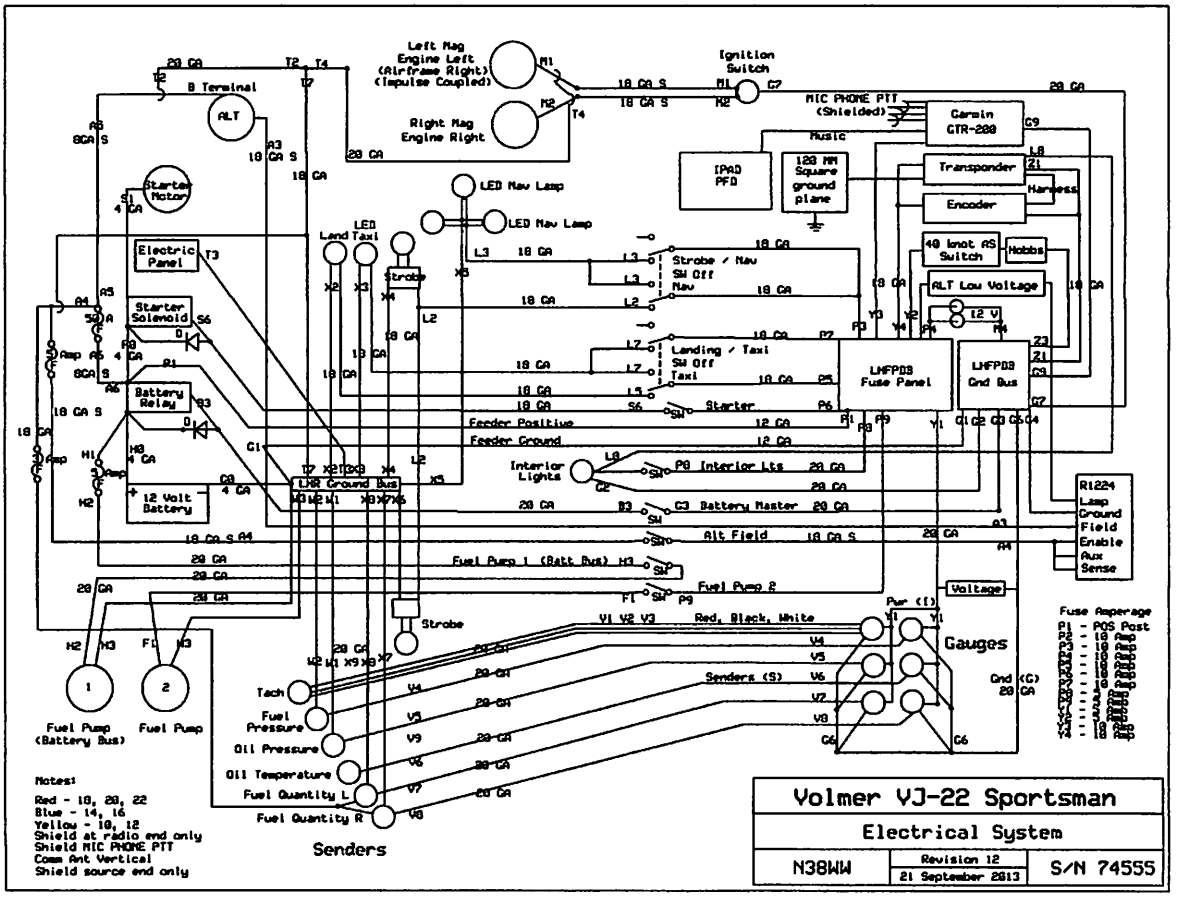
OIL SYSTEM

Oil Capacity..... 5.5 U.S. Quarts
Oil Multi-grade .....Phillips X/C 20W50
Below 40° F (4° C) ..... SAE 20
Above 40° F (4° C).....SAE 40

SPECIFIC LOADINGS

Wing Loading .....10.3 lbs/sq ft
Power Loading .....13.3 lbs/HP

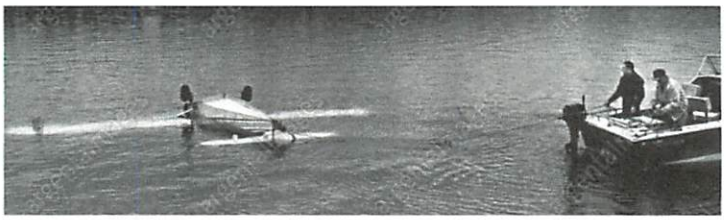
ELECTRICAL SYSTEM SCHEMATIC



Section 3

WARNING

Failure to retract the main landing gear during water operations will cause the aircraft to overturn causing substantial damage and injury or death



Operating Techniques

The following operating techniques have been found to be useful for operating Volmer VJ-22 S/N 74555.

- Starting Engine – Select the left magneto only for start as it is the only magneto with an impulse coupler. The ignition switch on some aircraft automatically make this selection during start, but not on this aircraft. Select both on the ignition switch after the engine starts.

- Begin cranking the engine with the starter motor – once the engine is cranking pump the throttle fully forward and aft rapidly to prime the engine through the MA-3SPA's accelerator pump. Do not pump prior to rotation as this would increase the chance for induction fire and cause fuel to leak from the carburetor air box.

- During taxi – taxi smoothly and use forward pressure on the elevator as conditions permit to minimize weight on the tail wheel. The structure of the fuselage at the tailwheel attach point is fragile.

- Prior to (or during - at pilots discretion) takeoff lean the engine to peak power. Note: Failure to lean the engine for water takeoff during high ambient temperatures may prevent the aircraft from being able to come on step, lengthen the takeoff run, and significantly reduce climb performance.

- Prior to landing on water - ensure the landing gear is in the up position. Form a habit of checking this prior to arrival at the body of water, on the downwind, base, and final, and prior to the flare. During a straight in approach – check prior to the body of water, at top of descent, 500' , and prior to the flare. Note: Accident data shows landing with the gear in the

down position to be responsible for over half of the hull losses of Volmers. Landing with the gear in the down position is easily overlooked by pilots regardless of experience level. Encourage all passengers to participate in this check of landing gear position, and brief the passenger well on procedures to be followed if the aircraft overturns on the water.

- When coming up onto step, the aircraft will porpoise at a fairly rapid rate with fairly large amplitude pitch changes. Smoothly apply back pressure on the stick until the oscillation ceases. Then slowly return to the desired pitch attitude.

- Be very cautious during operations in larger wave heights. Waves of only 1 foot make the takeoff run hazardous. Allow the aircraft to cut into waves at the normal takeoff pitch attitude – The aircraft is designed to do this. Should the aircraft become airborne prior to achieving flying speed, reduce the throttle to about half open. This will prevent the aircraft from pitching forward too rapidly and allow the aircraft to settle back to water. A decision can then be made whether to abort the takeoff run or continue.

- The aircraft may be flown with the canopy hatches removed. The wind level in the cockpit is very low and comfortable on warm days. Above 80MPH indicated airspeed a vibration caused by airflow disturbance near the windshield may be noticed. Reduce airspeed and that vibration will diminish. Water operations remain unchanged, and a very small amount of splash water will be taken on with the hatches removed. Avoid side slips with hatches removed.

Volmer VJ-22 Normal Procedures

Preflight

PREFLIGHT:

1. TFR / NOTAM / WX Brief ..... ACCOMPLISHED
2. MX Status / AROW / Charts .....ON BOARD / CURRENT

INTERIOR:

1. Landing Gear..... AS REQUIRED
2. Ignition.....OFF
3. Switches & Circuit Breaker..... OFF/ CHECK
4. Batt Master / Fuel Gauges ..... ON / CHECK / OFF
5. Baggage.....SECURED

EXTERIOR:

1. Fuselage / Engine / Exhaust..... LEAKS / CONDITION
2. Oil Tank / Cowling..... 5.5 QUARTS / CAP SECURE
3. Propeller / Alternator belt ..... NICKS / CONDITION
4. Tire / Brake L/R.....25 PSI / CONDITION
5. Wing / Aileron / Struts / Tip Floats L/R..... CONDITION
6. Pitot Tube..... NO BLOCKAGE / COVER REMOVED
7. Empennage / Tailwheel Tire and Spring..... CONDITION
8. Fuel / Fuel Sumps ..... SAMPLED / SERVICED / CAPS
9. Water Ballast Tank..... AS REQUIRED

Volmer VJ-22 Normal Procedures

Normal Procedures

BEFORE STARTING ENGINE:

1. Preflight Checks ..... COMPLETE
2. Passenger Brief / Seat Belts ..... COMPLETE / ON
3. Fuel Quantity ..... CHECK QUANTITY
4. Fuel Selector ..... FULLEST TANK

STARTING ENGINE:

1. Fuel Pump 1 ..... ON / VERIFY 4-6 PSI
2. Batt Master ..... ON
3. Strb / Nav ..... ON
4. Taxi Light ..... ON
5. Mixture ..... RICH
6. Carb Heat ..... COLD
7. Throttle ..... SLIGHTLY OPEN
8. Prop ..... CLEAR
9. Ignition ..... LEFT MAG
10. Starter ..... ENGAGE / PUMP THROTTLE
11. Oil Pressure ..... CHECK 80 PSI / 30 SECONDS
12. Ignition ..... BOTH
13. Alt Field / Voltage ..... ON / CHECK

BEFORE TAXI / WATER TAXI:

1. Landing Gear and Water Rudder ..... AS REQUIRED
3. Avionics / ATIS / Altimeter ..... ON / OBTAIN / SET
4. Flight Instruments ..... CHECK
5. Taxi Route ..... REVIEWED

RUN-UP:

1. Ignition 1100 & 2300 RPM ..... MAX 225 DROP / 75 DIFF
2. Carb Heat ..... CHECK / 100 RPM DROP / COLD
3. Fuel Pump Check ..... COMPLETE
4. Engine Instruments ..... CHECK
5. Throttle ..... IDLE CHECK THEN 1000 RPM
6. Flight Controls ..... FREE AND CORRECT
7. Trim ..... SET
8. Mixture ..... SET
9. Avionics ..... SET
10. TO & Emergency Briefing ..... COMPLETE

LINEUP:

1. Fuel Pumps 1 and 2 ..... ON
2. Exterior Lights ..... AS REQUIRED
3. Transponder ..... ALT
4. Hatches ..... CLOSED IF INSTALLED
5. Flow ..... TRIM / FREE / FUEL / 6 & 3
6. Water Rudder ..... AS REQUIRED

NOTE: Normal Climb 70 MPH – Vx 64 MPH – Vy 70 MPH

AFTER TAKEOFF:

1. Landing Gear..... AS REQUIRED
2. Exterior Lights..... AS REQUIRED

CRUISE:

1. Mixture..... LEAN
2. Carb Heat..... AS REQUIRED
3. Fuel Selector ..... AS REQUIRED

DESCENT:

1. Exterior Lights..... AS REQUIRED
2. ATIS / Altimeter .....OBTAIN / SET
3. Arrival and Safety Briefing ..... COMPLETE

WARNING

Exercise extreme caution when landing on water
Failure to retract the main landing gear during water operations will cause the aircraft to overturn causing substantial damage and injury or death

BEFORE LANDING - GUMP:

1. Fuel Selector.....AS REQUIRED
2. Fuel Pumps 1 and 2 ..... VERIFY ON
3. Landing Gear ..... AS REQUIRED

EXERCISE EXTREME CAUTION:
GEAR DOWN FOR LAND
GEAR UP FOR WATER

4. Carb Heat .....ON
5. Mixture..... RICH BELOW 3000 MSL
6. Speed.....80 MPH min till FINAL 70 MPH MIN
7. Glassy Water..... SELECT LVR
8. Pitch / Power..... LEVEL / 1800 RPM
9. LVR..... GO AROUND IF NOT CONFIGURED

GO AROUND:

1. Throttle..... FULL OPEN
2. Carb Heat ..... OFF

AFTER LANDING:

1. Water Rudder.....AS REQUIRED
2. Exterior Lights .....AS REQUIRED
3. Carb Heat ..... OFF
4. Fuel Pump 1 ..... OFF
5. Transponder..... STBY (unless ASDE airport)

SHUTDOWN:

1. Avionics ..... OFF
2. Throttle.....1800 RPM THEN IDLE AND MAG CHECK
3. Mixture .....CUTOFF
4. Ignition & Batt Master & Lights ..... OFF
5. SLIM Check.....COMPLETE

DOCKING / BEACHING:

1. Hatches / Headset / Harness ..... OPEN / REMOVED
2. Water Rudder.....AS REQUIRED

Emergency and Abnormal Procedures

COMPLETE POWER LOSS IN FLIGHT:

1. Airspeed..... BEST GLIDE (65 MPH)
2. Best Field ..... SELECT
3. Checklist .....RESTART
   - Carb Heat.....ON
   - Fuel.....DESIRED TANK
   - Mixture.....RICH AS REQUIRED
   - Fuel Pump 1 and Fuel Pump 2.....ON
   - Ignition.....CHECK L&R / THEN BOTH
4. Declare Emergency .....121.50 MHz / 7700
5. Emergency Landing .....EXECUTE
   - Landing Gear.....AS DESIRED
   - Right Wing Fuel.....OFF
   - Fuel Pump 1 and Fuel Pump 2 .....OFF
   - Mixture..... CUTOFF
   - Ignition.....OFF
   - Batt Master / Alt Field.....OFF
   - Seatbelt.....SECURE
   - Flare.....SLIGHTLY TAIL LOW

ELECTRICAL FIRE IN FLIGHT:

1. Emergency Descent .....EXECUTE
2. Declare Emergency .....121.50 MHz / 7700
3. Batt Master ..... OFF
4. Alt Field..... OFF

IF NO INDICATION SMOKE OR FIRE:

5. Land ..... NEAREST SUITABLE AIRPORT

IF SMOKE OR FIRE PERSIST:

6. Emergency Landing .....EXECUTE IMMEDIATELY

ENGINE FIRE DURING START:

1. Starter ..... CONTINUE CRANKING
2. Engine..... RUN FOR 1 MIN / SHUTDOWN / INSPECT

IF ENGINE FAILS TO START:

3. Mixture .....IDLE CUT-OFF
4. Fuel Pump 1 and Fuel Pump 2 ..... OFF
5. Fuel Selector..... OFF
6. Ignition ..... OFF
7. Batt Master / Alt Field ..... OFF
8. Aircraft / Fire Extiguishers..... EVACUATE / DISCHARGE

LOSS OF OIL PRESSURE IN FLIGHT:

1. Land..... NEAREST SUITABLE AIRPORT
2. If Oil Temp Increasing ..... ANTICIPATE POWER LOSS

ENGINE FIRE IN FLIGHT:

1. Emergency Descent .....EXECUTE
2. Fuel Selector..... OFF
3. Fuel Pump 1 and Fuel Pump 2..... OFF
4. Mixture..... CUTOFF
5. Ignition..... OFF
6. Declare Emergency .....121.50 MHz / 7700
7. Batt Master ..... OFF
8. Seatbelts.....SECURE
9. Emergency Landing .....EXECUTE

RECOVERY FROM INADVERTANT SPIN:

1. Throttle.....CLOSED
2. Ailerons.....NEUTRAL
3. Rudder ..... OPPOSITE DIRECTION OF ROTATION
4. Elevator.....BRISKLY FORWARD
5. Throttle...INCREASE IF NO RECOVERY AFTER 2 TURNS

RECOVERY FROM INADVERTANT STALL:

1. AOA ..... REDUCE / PUSH FORWARD STICK
2. Throttle.....FULL OPEN
3. Airspeed.....INCREASE (EXPECT 250' LOSS ALT)

ALTERNATOR FAILURE:

1. Electrical Load.....REDUCE

I. If Alt Field Fuse..... CHECK
- Alt Field..... OFF
- Alt Field Fuse.....REPLACE (IF REQUIRED)
- Alt Field..... ON

- If Fuse blows again -

- Alt Field..... OFF
- Land ..... AS SOON AS PRACTICAL

II. If Alt 50 Amp C/B ..... CHECK (IF TRIPPED)
- Alt Field..... OFF
- Alt 50 Amp C/B ..... RESET CONSIDERED
- Alt Field..... ON IF RESET

- if the Alt Output C/B trips again-

- Alt Field..... OFF
- Land ..... AS SOON AS PRACTICAL

CARBURETOR ICING:

1. Carb Heat ..... ON
2. Mixture .....ADJUST FOR SMOOTH OPERATION

ENGINE OVERHEAT:

1. Power.....REDUCE
2. Airspeed..... INCREASE
3. Mixture ..... ENRICHEN

Emergency and Abnormal Procedures (Continued)

ENGINE ROUGHNESS:

1. Fuel Pump 1 and Fuel Pump 2 ..... ON
2. Carb Heat ..... ON
3. Mixture ..... ADJUST FOR SMOOTH OPERATION
4. Ignition ..... CHECK L and R
5. Land ..... NEAREST SUITABLE AIRPORT

INADVERTENT HATCH OPENING:

1. Control ..... MAINTAIN- AVOID DISTRACTION
2. Door ..... CLOSE – SPEED AND ALTITUDE PERMITTING

INOPERATIVE STAB TRIM:

1. Elevator Control Forces ..... MAY BE INCREASED

LANDING WITH LOSS OF AIRSPEED:

1. Pitch and Power ..... NORMAL OR SLIGHTLY STEEPER
2. Runway ..... SELECT LONG RUNWAY

PARTIAL POWER LOSS IN FLIGHT:

1. Land ..... NEAREST SUITABLE AIRPORT
2. Carb Heat ..... ON
3. Mixture ..... ADJUST FOR SMOOTH OPERATION
4. Ignition ..... CHECK L&R

STARTER DOES NOT DISENGAGE:

1. Batt Master / Alt Field ..... OFF
2. Mixture ..... IDLE CUT-OFF
3. Ignition ..... OFF

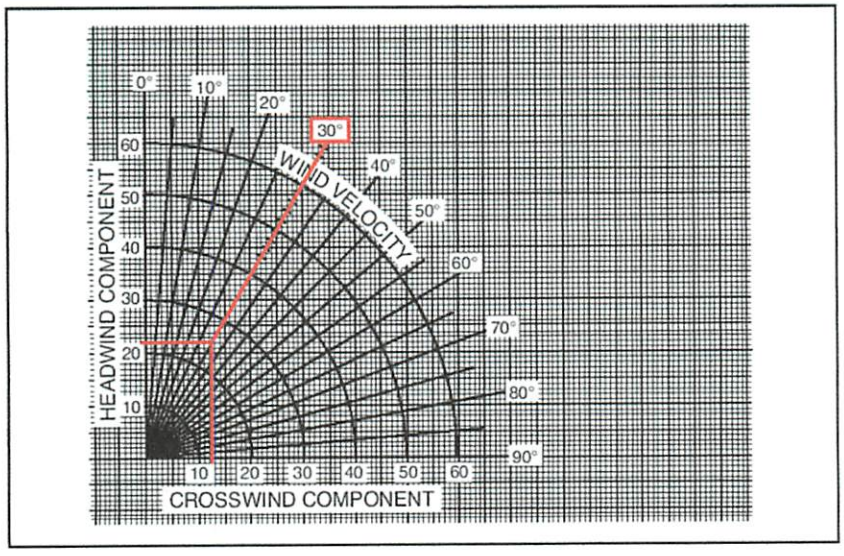
STRUCTURAL ICING:

1. Carb Heat ..... AS REQUIRED
2. Airspeed Indicator ..... ANTICIPATE LOSS
3. Approach Airspeed ..... HIGHER THAN NORMAL
4. Runway ..... SELECT LONG RUNWAY

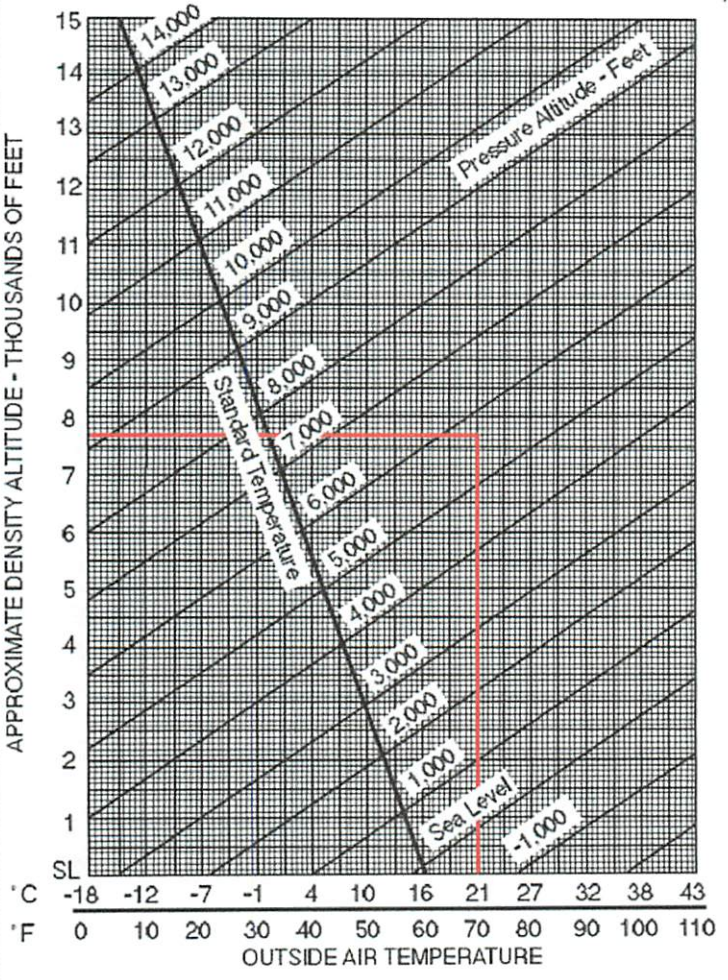
Performance

Volmer performance data S/N 74555

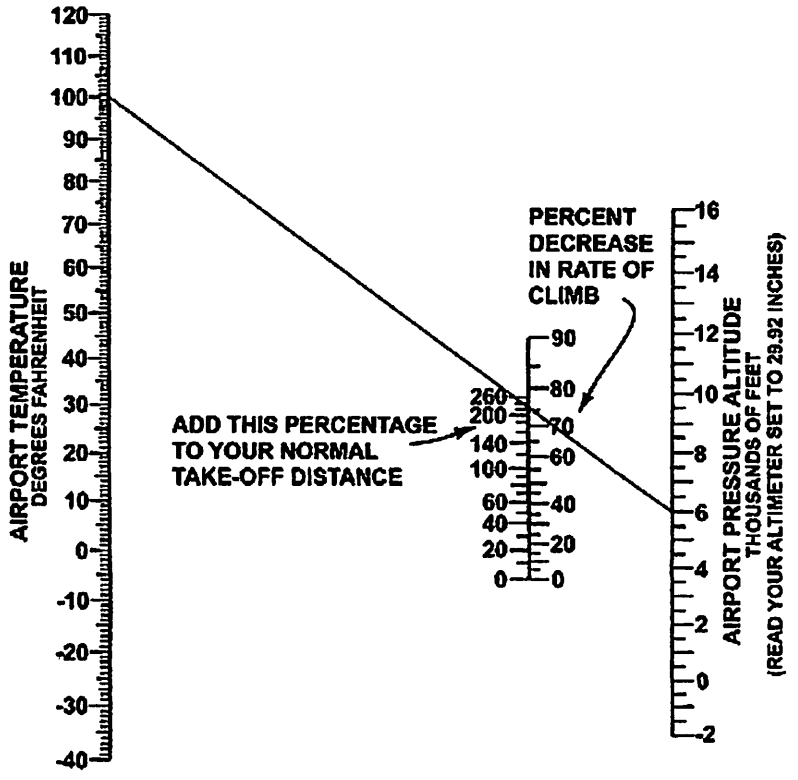
Temp	Fuel	Crew Weight	Gross Weight	Ballast	Wind	Waves	Ease On Step	Ease Off Water
75	20 Gal	330	1580	No	Light	4"	Good	Good
75	32 Gal	180	1537	Yes	Light	4"	Good	Good
75	31 Gal	310	1661	Yes	Light	10"	Poor	Poor
75	27 Gal	370	1663	No	Light	12"	Poor	Severe Porpoise over waves – Do not replicate
75	25 Gal	370	1651	No	Light	4"	Fair	Fair
70	16 Gal	375	1636	Yes	18 knots	7"	Good	Good – Wind helps – Inadequate elevator for landing on land
60	29	340	1650ish	No	14 knots	4"	Very Good	Good



DENSITY ALTITUDE CHART



Altimeter Setting (" Hg)	Pressure Altitude Conversion Factor
28.0	1,824
28.1	1,727
28.2	1,630
28.3	1,533
28.4	1,436
28.5	1,340
28.6	1,244
28.7	1,148
28.8	1,053
28.9	957
29.0	863
29.1	768
29.2	673
29.3	579
29.4	485
29.5	392
29.6	298
29.7	205
29.8	112
29.9	20
29.92	0
30.0	-73
30.1	-165
30.2	-257
30.3	-348
30.4	-440
30.5	-531
30.6	-622
30.7	-712
30.8	-803
30.9	-893
31.0	-983


AIRPORT TEMPERATURE
DEGREES FAHRENHEIT
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
ADD THIS PERCENTAGE
TO YOUR NORMAL
TAKE-OFF DISTANCE
260
200
140
100
60
40
20
0
PERCENT
DECREASE
IN RATE OF
CLIMB
90
80
70
60
40
20
0
AIRPORT PRESSURE ALTITUDE
THOUSANDS OF FEET
(READ YOUR ALTIMETER SET TO 29.92 INCHES)
16
14
12
10
8
6
4
2
0
-2

Servicing

ELECTRICAL SYSTEM

Charging the battery with the Aerovoltz Battery Management System (BMS) digital balance charger

1. Prior to starting any charge functions, connect the red and black cables to the battery and connect the BMS connector cable
2. Select LiFe battery
3. Select Balance Mode
4. Select 2.0 Amps and 13.2 Volts
5. Press Start/Enter for more than 3 seconds
6. Check if R: 4SER and S: 4SER values are the same, if yes start charge by pressing the Start/Enter button

WARNING

Do not charge the battery at or above 14.4 volts
Max amps: (12 Cell) 20A at 13.2-14.4 volts

ENGINE

Change oil at 25 Hour intervals
Note: Per Franklin engine manual; oil screen is integral to oil sump and is only serviced during engine major overhaul.

Timing per Franklin Manual.....Both Magnetos @ 32 BTDC
Recommended TBO.....1500 Hours
Spark Plugs and Harness.....18 MM - 3/4x20 - RHB 32E / CH12360 – M2360
Spark Plug Torque.....330–360 pound/inches
Firing Order.....1-4-2-3
Valve Rocker Clearance w/ Lifters Bled Down and Engine Cold....0.036" – 0.044"

PROPELLER

Torque propeller at every oil change and during spring and fall DST clock changes – Dry prop bolts – torque to 15-18 ft-lbs. as listed on the Sterba Propeller installation letter.

UNDERCARRIAGE

Tire pressure.....20-25 PSI
Tire size.....600x6
Wheel brake hydraulic fluid.....MIL-H-5606

RIGGING

Level aircraft at cockpit upper longerons laterally and fore and aft.
1 degree of dihedral and .5-1 degree of washout by testing
Engine 1 degree up thrust
"Elevator" 4 degrees down
Control throws – Aileron 28 up and 18 down, Elevator 24 up and down, Rudder 25 left and right
Cowling support brackets are notched (numbered) to correspond to which cylinder it attaches adjacent.

Weight and Balance Report
1994 Volmer VJ-22 Sportsman S/N 74555 N38WW

New Basic Empty Weight	1123.56 lbs
New Empty C.G. (aft of W.L.E.)	25.859"
Maximum Gross Takeoff Weight	1650 lbs
New Useful Load	526.44 lbs
Center of Gravity Limits	11.5"-18"

Warning:
Solo operation requires ballast in the nose to keep aircraft within aft CG limit.
Perform weight and balance computation prior to flight

	Nose	Instrument Panel	Pilot and Copilot	Main Landing Gear	Leading Edge of Wing	Fuel	Baggage	Propeller	Tailwheel
ARM	-82.0	-46.5	-22.5	-1.25	0"	19.0	19.0	39.0	190.25

Approved by Joseph Dougherty ATP2792525

Signature _____ Date: 4 Nov 2014

Record of Changes to Weight and Balance
1994 Volmer VJ-22 Sportsman S/N74555 N38WW

Scale Location	Scale Reading	Arm	Moment
Left Wheel	474	-1.25	-592.5
Right Wheel	487	-1.25	-608.75
Tail Scale Point	159	190.25	30245.75
Total	1120		29048.5

Changes since W&B report dated 23 September 2013:					
Date	Item		Weight	Arm	Moment
5 Sept 2013	Aircraft Empty W&B – weighed on certified scales		1120	25.936 "	29048.32
5 Sept 2013	Fire Extinguisher	Added	2.3	-20	-46.0
23 Sept 2013	Voltage regulator	Added	.3	-50	-15.0
23 Sept 2013	RGB Led light strip	Added	.2	-50	-10
23 Oct 2013	Valcom 760 radio	Rmvd	-3.5	-50	+175.0
23 Oct 2013	Sigtronics SPA-400N Intercom	Rmvd	-.4	-48	+19.2
23 Oct 2013	Garmin GTR-200 transceiver and Intercom	Added	1.91	-49	-93.59
7 Feb 2014	Acoustic insulation inside fuselage below propeller	Added	1.0	36	36.0
7 Feb 2014	First Aid Kit	Added	.4	8	3.2
7 Feb 2014	Apple Ipad 2 A1396	Added	1.35	-47	-63.45
11 Sep 2014	Prince P-tip 70/40 / S/N 5565P70BP40LK	Rmvd	-10	+39	
11 Sep 2014	Sterba Aircraft Propeller 72-38 S/N 09147238	Added	8	+39	
11 Sep 2014	New Aircraft Empty Weight and Arm		1121.56	25.835	28975.68

Modifications from plans
Incorporated in VJ-22 S/N 74555

Modification	Installed
Improved landing gear down lock handle	X
Retract mechanism – Al Schauss gear retract mechanism.	X
Canopy hatches lengthened for easier ingress and egress	X
Gas struts – 7 lbs gas furniture struts hold canopy open.	X
Strakes – 6" x 14" just forward of step at equal angle down as hull bottom is up.	
Cowling with oil servicing hatch	X
Battery location and LIFEPO chemistry	X
Larger water rudder	X
Nose ballast	
Full Lotus sponsons	X
Lexan canopy and windshield for impact protection	X
Fixed Tailwheel	
Tractor engine installation	
Retractable tip floats	
Installation of Franklin O-235 Sport 4 engine	X
Alternator modified to external regulation	X

Equipment List
1994 Volmer VJ-22 Sportsman S/N74555 N38WW

Item	Make / Model / Part Number / S/N	WGHT (lbs.)	ARM / MOMENT (Ref WLE)	Included in Weight and Balance
Propeller (When Installed)	Sterba Aircraft Propeller 72-38 / S/N09147238	10	+39	X
Propeller (When Installed	Prince P-tip 70/40 / S/N 5565P70BP40LK	10	+39	
Propeller Extension				X
Wing fuel tanks			+19	X
Engine	Franklin 4A-235 / Sport 4 / 6853			X
Carburetor	MA3SPA 1522 FF / 10-4654-1 / BN 6212 V			X
Bendix Magneto (RH)	S4RN-21 / 10-51360-41 / B003967			X
Bendix Magneto (LH)	S4RN-20 / 10-51360-40 / B003966			X
Fuel Pump 1	Facet 40108			X
Fuel Pump 2	Facet 478360E			X
Alternator	40 Amp Nippondenso 100211-6931 modified to external regulation			X
Regulator	Plane Power 1224 Rev C. S/N131872	.3 lbs		X
Starter	Sky-Tec Model / F12ST1 / F2-380104			X
Air Filter	Bracket BA-4108 / BA4106 Element			X
Gascolator				X
Fuel Quick Drains (3)				X
Fuel Level Senders	Skysports P/N FP1212S			X
Ignition Switch				X
Battery Relay				X
Starter Solenoid				X
Wheels and Brakes				X
Main Tires	6.00 X 6		-1.25	X
Tailwheel	Scott 2000 modified per plans		+190.25	X
Battery	Aerovoltz 12 cell LIFEPO	2lb 5oz		X
Pitot Tube				X
Circuit Breaker				X
Fuse Block				X
Spare Fuses (FAR 91.205)				X
Aux Power Points (3)				X
Antenna (Com)				X
Antenna (Transponder)				X
EFIS	I-Pad 2 Model A1396 16GB	1.35		X
Comm Radio	Garmin GTR-200 S/N 2QQ005094	1.91		X
Intercom	Integral to Garmin GTR-200			X
Transponder	Garmin GTX320A P/N 011-00728-00 S/N 83808544			X
Encoder	Ameri-King AK-350 P/N AK-350 S/N 78787			X
ELT	Ameri-King AK-450			X
Anti-collision Lights and Power Supplies	Whelen			X
Fire Extinguisher				X
Documentation	AROW / AFM / Limitations / Equipment List			X
First Aid Kit				X
Bailing Bucket				
Fishing Poles				
Water Ballast Container				
Boat Pole / Paddle				

U.S. Department
of Transportation
Federal Aviation
Administration

DuPage Flight Standards District Office

31W775 North Avenue
DuPage Airport
West Chicago, IL 60185-1056
(630) 443-3100

Operating Limitations

Experimental Amateur-Built

Registration No.:	**N38WW**
Make:	**William D.Wedlund**
Model:	**VJ-22**
Serial No.:	**74555**

(1) No person may operate this aircraft for other than the purpose of meeting the requirements of 14 CFR § 91.319(b) during phase I flight testing, and for recreation and education after meeting these requirements as stated in the program letter (required by 14 CFR § 21.193) for this aircraft. In addition, this aircraft must be operated in accordance with applicable air traffic and general operating rules of 14 CFR part 91 and all additional limitations herein prescribed under the provisions of 14 CFR § 91.319(i). These operating limitations are a part of FAA Form 8130-7, and are to be carried in the aircraft at all times and be available to the pilot in command of the aircraft.

(2) During phase I flight testing to meet the requirements of 14 CFR § 91.319(b), all flights must be conducted within the geographical area described as follows:

(a) A 50 statute mile radius, of Aurora Municipal (ARR) Airport. Aurora, Illinois.

(b) The designated area must be over open water or sparsely populated areas having light air traffic.

(c) The size of the area must be that required to safely conduct anticipated maneuvers and tests, as appropriate.

(3) This aircraft must be operated for at least 25 hours in the assigned geographic area.

(4) All test flights, at a minimum, must be conducted under VFR, day only. Guidance concerning the scope and detail of test flights can be found in AC 90-89. Following satisfactory completion of the required number of flight hours in the flight test area, the pilot must certify in the records that the aircraft has been shown to comply with 14 CFR § 91.319(b). Compliance with 14 CFR § 91.319(b) must be recorded in the aircraft records with the following, or a similarly worded, statement: **"I certify that the prescribed flight test hours have been completed and the aircraft is controllable throughout its normal range of speeds and throughout all maneuvers to be executed, has no hazardous operating characteristics or design features, and is safe for operation. The following aircraft operating data has been demonstrated during the flight testing:**

speeds Vso 55, Vx 71, and Vy 74, and the weight 1650 and CG location 15.6" at which they were obtained."

(5) Except for takeoffs and landings, this aircraft may not be operated over densely populated areas or in congested airways.

(6) This aircraft is prohibited from operating in congested airways or over densely populated areas unless directed by air traffic control, or unless sufficient altitude is maintained to effect a safe emergency landing in the event of a power unit failure, without hazard to persons or property on the ground.

(7) This aircraft is to be operated under VFR, day only.

(8) After completion of phase I flight testing, unless appropriately equipped for night and/or instrument flight in accordance with 14 CFR § 91.205, this aircraft is to be operated under VFR, day only.

(9) Aircraft instruments and equipment installed and used under 14 CFR § 91.205 must be inspected and maintained in accordance with the requirements of 14 CFR part 91. Any maintenance or inspection of this equipment must be recorded in the aircraft logbook and maintenance records.

(10) During the flight testing phase, no person may be carried in this aircraft during flight unless that person is essential to the purpose of the flight.

(11) No person may operate this aircraft for carrying persons or property for compensation or hire.

(12) The pilot in command of this aircraft must advise each passenger of the experimental nature of this aircraft, and explain that it does not meet the certification requirements of a standard certificated aircraft.

(13) This aircraft must contain the placards, markings, as required by 14 CFR § 91.9. In addition, the placards and markings must be inspected for legibility and clarity, and the associated systems inspected for easy access and operation, to ensure they function as intended by the amateur builder/owner during each condition inspection.

(14) This aircraft must display the word "EXPERIMENTAL" in accordance with 14 CFR § 45.23(b).

(15) This aircraft is prohibited from aerobatic flight, that is, an intentional maneuver involving an abrupt change in the aircraft's attitude, an abnormal attitude, or abnormal acceleration not necessary for normal flight.

(16) N/A

(17) N/A

(18) The pilot in command of this aircraft must hold a pilot certificate or an authorized instructor's logbook endorsement. The pilot in command also must meet the requirements of 14 CFR § 61.31(e), (f), (g), (h), (i), and (j), as appropriate.

(19) After incorporating a major change as described in 14 CFR § 21.93, the aircraft owner is required to reestablish compliance with 14 CFR § 91.319(b) and notify the geographically responsible FSDO of the location of the proposed test area. The aircraft

owner must obtain concurrence from the FSDO as to the suitability of the proposed test area. If the major change includes installing a different type of engine (reciprocating to turbine) or a change of a fixed-pitch from or to a controllable propeller, the aircraft owner must fill out a revised FAA Form 8130-6 to update the aircraft's file in the FAA Aircraft Registration Branch. All operations must be conducted under day VFR conditions in a sparsely populated area. The aircraft must remain in flight test for a minimum of 5 hours. The FSDO may require additional time (more than 5 hours) depending on the extent of the modification. Persons nonessential to the flight must not be carried. The aircraft owner must make a detailed aircraft logbook maintenance records entry describing the change before the test flight. Following satisfactory completion of the required number of flight hours in the flight test area, the pilot must certify in the records that the aircraft has been shown to comply with 14 CFR § 91.319(b). Compliance with 14 CFR § 91.319(b) must be recorded in the aircraft records with the following, or a similarly worded, statement: **"I certify that the prescribed flight test hours have been completed and the aircraft is controllable throughout its normal range of speeds and throughout all maneuvers to be executed, has no hazardous characteristics or design features, and is safe for operation. The following aircraft operating data has been demonstrated during the flight testing: speeds Vso 55, Vx 71, and Vy 74, and the weight 1650, and CG location 15.6" at which they were obtained."**

(20) This aircraft must not be used for glider towing, banner towing, or intentional parachute jumping.

(21) This aircraft does not meet the requirements of the applicable, comprehensive, and detailed airworthiness code as provided by Annex 8 to the Convention on International Civil Aviation. The owner/operator of this aircraft must obtain written permission from another CAA before to operating this aircraft in or over that country. That written permission must be carried aboard the aircraft together with the U.S. airworthiness certificate and, upon request, be made available to an FAA inspector or the CAA in the country of operation.

(22) No person must operate this aircraft unless within the preceding 12 calendar months it has had a condition inspection performed in accordance with the scope and detail of 14 CFR part 43, appendix D, or other FAA-approved programs, and was found to be in a condition for safe operation. As part of the condition inspection, cockpit instruments must be appropriately marked and needed placards installed in accordance with 14 CFR § 91.9. In addition, system-essential controls must be in good condition, securely mounted, clearly marked, and provide for ease of operation. This inspection will be recorded in the aircraft logbook and maintenance records.

(23) Condition inspections must be recorded in the aircraft logbook and maintenance records showing the following, or a similarly worded, statement: **"I certify that this aircraft has been inspected on [insert date] in accordance with the scope and detail of 14 CFR part 43 appendix D, and was found to be in a condition for safe operation."** The entry will include the aircraft's total time-in-service (cycles if appropriate), and the name, signature, certificate number, and type of certificate held by the person performing the inspection.

(24) N/A

(25) N/A

(26) An experimental aircraft builder certificated as a repairman for this aircraft under 14 CFR § 65.104 or an appropriately rated FAA-certificated mechanic may perform the condition inspection required by these operating limitations.

(27) Application must be made to the geographically responsible FSDO or MIDO for any revision to these operating limitations.

(28) The pilot in command of this aircraft must notify air traffic control of the experimental nature of this aircraft when operating into or out of airports with an operational control tower. When filing Instrument Flight Rules (IFR), the experimental nature of this aircraft must be listed in the remarks section of the flight plan.

These limitations are issued in accordance with Order 8130.2G, and are of UNLIMITED duration and are a part of a Special Airworthiness Certificate issued **09/11/2014**

Date of Issue: **09/11/2014**

Issued By: **Spencer Cull** Spencer Cull
Aviation Safety Inspector