

MINIMUM INSTRUMENT AND EQUIPMENT REQUIREMENTS FOR POWERED AMATEUR BUILT EXPERIMENTAL AIRCRAFT

Introduction: The table below is intended to give the builder of amateur built experimental aircraft a ready reference for the instrument and equipment requirements for his aircraft. The builder should note that some items required by the FAR's are described in the FAR's as needing to be approved, but since there are no certification standards established for amateur built experimental aircraft no formal individual item approval, such as meeting a TSO (Technical Standard Order) or FAR Part 23, is required. However certain items must interface properly with ATC (Air Traffic Control), other aircraft, or other entities external to the aircraft. Transponders, communication radios, exterior lighting and ELT's (Emergency Locator Transmitters) are examples of such equipment. Therefore, the builder can expect that the initial airworthiness inspection of his aircraft will require evidence that this type of equipment in the aircraft is acceptable to the FAA.

The Special Airworthiness Certificate issued for each amateur built experimental aircraft includes specific Operating Limitations. Per FAA Order 8130.2F the Operating Limitations state: "After completion of Phase I flight testing, unless appropriately equipped for night and/or instrument flight in accordance with 91.205, this aircraft is to be operated under VFR, day only." The FAR's, FAA Order 8130.2F, and current FAA policy have been used in constructing the below amateur built experimental aircraft configuration requirements table.

THIS TABLE DOES NOT PROVIDE RECOMMENDATIONS FOR BEST PRACTICES. INSTALLING ONLY THE MINIMUM REQUIRED ITEMS MAY NOT BE PRUDENT OR SAFE.

By Owen C. Baker with appreciation to Richard E. Koehler.

MINIMUM INSTRUMENT AND EQUIPMENT REQUIREMENTS FOR POWERED AMATEUR BUILT EXPERIMENTAL AIRCRAFT

| <u>FAR & ITEM DESCRIPTION (See Notes Below Table)</u> | <u>DAY VFR</u> | <u>NIGHT VFR</u> | <u>DAY OR NIGHT IFR</u> |
|---|--------------------|----------------------|-----------------------------|
| 1. 91.205 (b) (1) Airspeed Indicator | NR | R | R |
| 2. 91.205 (b) (2) Altimeter | NR | R | R |
| 3. 91.205 (b) (3) Magnetic Direction Indicator | NR | R | R |
| 4. 91.205 (b) (4) Tachometer for Each Engine | NR | R | R |
| 5. 91.205 (b) (5) Oil Pressure Gauge for Each Engine Using a Pressure System | NR | R | R |
| 6. 91.205 (b) (6) Temperature Gauge for Each Liquid Cooled Engine | NR | R | R |
| 7. 91.205 (b) (7) Oil Temperature Gauge for Each Air Cooled Engine | NR | R | R |
| 8. 91.205 (b) (8) Manifold Pressure Gauge for Each Altitude Engine | NR | R | R |
| 9. 91.205 (b) (9) Fuel Gauge Indicating Quantity of Fuel | NR | R | R |

| | | | | |
|-----|---|-----|-----|----|
| | In Each Tank | NR | R | R |
| 10. | 91.205 (b) (10) Landing Gear Position Indicator, If Retractable | NR | R | R |
| 11. | 91.205 (b) (11) Anti-Collision Light System - (Small civil airplanes certified after 3/11/96) | NR | R | R |
| 12. | 91.205 (b) (13) Approved Safety Belts With Metal to Metal Buckles for Each Occupant (2 yrs or older) | NR | R | R |
| 13. | 91.205 (b) (14) Approved Shoulder Harness for Each Front Seat - For Small Civil Airplanes Manufactured After 7/18/78 | NR | R | R |
| 14. | 91.205 (b) (15) ELT (If required by Sec. 91.207, i.e. >one seat and >50 miles) | AR | AR | AR |
| 15. | 91.205 (b) (16) Approved Shoulder Harness for Each Seat – Airplanes With 9 or Less Seats Manufactured After 12/12/86 | NR | R | R |
| 16. | 91.205 (b) (17) Shoulder Harness for Each Seat For Rotorcraft – Manufactured After 9/16/92 | NR | R | R |
| 17. | 91.205 (c) (2) Approved Position (navigation) Lights | NR | R | R |
| 18. | 91.205 (c) (3) Anti-Collision Light System (Systems installed after 8/11/71 - see reference) | NR | R | R |
| 19. | 91.205 (c) (5) Adequate Source of Electrical Energy for Installed Equipment | NR | R | R |
| 20. | 91.205 (c) (6) One Spare Set of Fuses or Three Fuses of Each Kind Required, Must be Accessible to Pilot In Flight | NR | R | R |
| 21. | 91.205 (d) (2) Two-Way Radio Communication System and Navigational Equipment Appropriate to Ground Facilities Used | NR | NR | R |
| 22. | 91.205 (d) (3) Gyroscopic Rate of Turn Indicator (Some Exceptions, See Reference) | NR | NR | R |
| 23. | 91.205 (d) (4) Slip-Skid Indicator | NR | NR | R |
| 24. | 91.205 (d) (5) Sensitive Altimeter Adjustable for Barometric Pressure | NR | NR | R |
| 25. | 91.205 (d) (6) Clock Displaying Hours, Minutes, and Seconds – Sweep Second Pointer or Digital | NR | NR | R |
| 26. | 91.205 (d) (7) Electrical Generator or Alternator of Adequate Capacity | NR | NR | R |
| 27. | 91.205 (d) (8) Gyroscopic Bank and Pitch Indicator (Artificial Horizon) | NR | NR | R |
| 28. | 91.205 (d) (9) Gyroscopic Direction Indicator (Directional Gyro or Equivalent) | NR | NR | R |
| 29. | 91.205 (e) DME Above FL 240 | N/A | N/A | AR |
| 30. | 91.215, Transponder in Certain Airspace, (See FAR 91.413, Inspection Required Every 24 Calendar Months) | AR | AR | AR |
| 31. | 91.411, Altimeter System Inspection Required Every 24 Calendar Months | NR | NR | R |

Notes:

(1) AR = As Required, NR = Not Required, N/A = Not Applicable, R = Required

(2) A fourth flight operation category, Day (only) Instruments, is not included above.