Airworthiness Directive

Agency: Federal Aviation Administration, DOT

Action: Final rule.

Summary: This amendment adopts a new airworthiness directive (AD) that applies to all aircraft equipped with Precise Flight, Inc. Model SVS III standby vacuum systems installed in accordance with the applicable supplemental type certificate (STC) or through field approval. This AD requires incorporating revised operating limitations for the affected standby vacuum systems into the airplane flight manual (AFM), and repetitively inspecting the push-pull cable, vacuum lines, saddle fittings, and shuttle valve for correct installation and damage (wear, chafing, deterioration, etc.). This AD also requires immediately correcting any discrepancy found and conducting a function test of the vacuum system after the inspections. This AD is the result of reports of shuttle valve failure and standby vacuum system malfunction on aircraft. The actions specified by this AD are intended to detect and correct problems with the standby vacuum system before failure or malfunction and to provide operating procedures for the pilot regarding the use and limitations of this system.


The incorporation by reference of certain publications listed in the regulations is approved by the Director of the Federal Register as of January 14, 2000.

Addresses: Service information that applies to this AD may be obtained from Precise Flight, Inc., 63120 Powell Butte Road, Bend, Oregon 97701; telephone: (800) 547-2558. This information may also be
SUPPLEMENTARY INFORMATION:

Events Leading to the Issuance of This AD
A proposal to amend part 39 of the Federal Aviation Regulations (14 CFR part 39) to include an AD that would apply to all aircraft equipped with Precise Flight, Inc. Model SVC III standby vacuum systems installed in accordance with the applicable supplemental type certificate (STC) or through field approval was published in the Federal Register as a notice of proposed rulemaking (NPRM) on July 7, 1999 (64 FR 36618). The NPRM proposed to require incorporating revised operating limitations for the affected standby vacuum systems into the airplane flight manual (AFM), and repetitively inspecting the push-pull cable, vacuum lines, saddle fittings, and shuttle valve for correct installation and damage (wear, chafing, deterioration, etc.). The NPRM also proposed to require immediately correcting any discrepancy found and conducting a function test of the vacuum system after each inspection.

The NPRM was the result of reports of shuttle valve failure and standby vacuum system malfunction on aircraft.

Interested persons have been afforded an opportunity to participate in the making of this amendment. No comments were received on the proposed rule or the FAA's determination of the cost to the public.

The FAA's Determination
After careful review of all available information related to the subject presented above, the FAA has determined that air safety and the public interest require the adoption of the rule as proposed except for minor editorial corrections. The FAA has determined that these minor corrections will not change the meaning of the AD and will not add any additional burden upon the public than was already proposed.

Compliance Time of This AD
The compliance times of this AD are presented in calendar time. Although malfunction or failure of the standby vacuum systems is only unsafe while the aircraft is in flight, the condition is not a direct result of repetitive aircraft operation. The unsafe condition could exist on a standby vacuum system installed on an aircraft with only 50 hours time-in-service (TIS), but may not develop on another standby vacuum system installed on an aircraft until 1,000 hours TIS. The inspection compliance times are utilized to coincide with annual inspections so as to allow the owner/operator of the aircraft to have the required action accomplished at a time when he/she has already scheduled maintenance activities.

Cost Impact
The FAA estimates that 10,000 standby vacuum systems will be affected by this AD, that it will take approximately 3 workhours per vacuum system to accomplish the actions, and that the average labor rate is approximately $60 an hour. Based on these figures, the total cost impact
of this AD on U.S. operators is estimated to be $1,800,000, or $180 per airplane.

These figures only take into account the costs of the initial inspection and initial functional test of the standby vacuum systems; subsequent inspections and functional tests and any corrective actions are not included in the cost impact. The FAA has no way of determining the number of repetitive inspections and functional tests each airplane owner/operator will incur over the life of an airplane incorporating one of the affected standby vacuum systems. The FAA also has no way of determining the number of standby vacuum systems that will require corrective action based on the inspection results.

**Regulatory Impact**

This rule does not have Federalism implications as defined in Executive Order No. 13132. This means it does not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. The FAA has not consulted with state authorities prior to publication of this rule. For the reasons discussed above, I certify that this action (1) is not a "significant regulatory action" under Executive Order 12866; (2) is not a "significant rule" under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979); and (3) will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act. A copy of the final evaluation prepared for this action is contained in the Rules Docket. A copy of it may be obtained by contacting the Rules Docket at the location provided under the caption "ADDRESSES".

**List of Subjects in 14 CFR Part 39**

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

**Adoption of the Amendment**

Accordingly, pursuant to the authority delegated to me by the Administrator, the Federal Aviation Administration amends part 39 of the Federal Aviation Regulations (14 CFR part 39) as follows:

**PART 39 - AIRWORTHINESS DIRECTIVES**

1. The authority citation for part 39 continues to read as follows:

   Authority: 49 U.S.C. 106(g), 40113, 44701.

   § 39.13 [Amended]

   2. Section 39.13 is amended by adding a new airworthiness directive (AD) to read as follows:

   **Regulatory Information**

   **99-24-10 PRECISE FLIGHT, INC.:** Amendment 39-11434; Docket No. 98-CE-87-AD. Issued November 15, 1999. Applicability: Model SVS III standby vacuum systems, installed on, but not limited to, the aircraft listed in the following chart. These systems can be installed either in accordance with the applicable supplemental type certificate (STC) or through field approval:

<table>
<thead>
<tr>
<th>Affected STC</th>
<th>Make and Model Airplanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA2161NM</td>
<td>Raytheon Beech Model V35B</td>
</tr>
<tr>
<td>SA2162NM</td>
<td>Cessna Models 120, 140, 140A, 150, 150A, 150B, 150C, 150D, 150E, 150F,</td>
</tr>
<tr>
<td>Model</td>
<td>Description</td>
</tr>
<tr>
<td>-------</td>
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</tr>
<tr>
<td>Cessna Model U206G</td>
<td></td>
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<tr>
<td>Cessna Model 180Q</td>
<td></td>
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<tr>
<td>Cessna Model 177</td>
<td></td>
</tr>
<tr>
<td>Aerocar, Inc. Model I</td>
<td></td>
</tr>
<tr>
<td>Aerodifusion, S.L. Model Jodel D-1190S</td>
<td></td>
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<tr>
<td>Aeromere, S.A. Model Falco F.8.L.</td>
<td></td>
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<tr>
<td>Aeronautica Macchi S.P.A. Models AL60, AL60-B, AL60-F5, and AL60-C5</td>
<td></td>
</tr>
<tr>
<td>Aeronautica Macchi &amp; Aerfer Model AM-3</td>
<td></td>
</tr>
<tr>
<td>Aeromca Inc. Models 15AC and S15AC</td>
<td></td>
</tr>
<tr>
<td>Aerospatiale Model TB20 Trinidad</td>
<td></td>
</tr>
<tr>
<td>Arctic Aircraft Co., Inc. Models S-1A, S-1A-65F, S-1A-85F, S-1A-90F, S-1B1(Army L-67 XL-6), and S-1B2</td>
<td></td>
</tr>
<tr>
<td>Avions Mudry et Cie Model CAP 10B</td>
<td></td>
</tr>
<tr>
<td>American Champion Models (Bellanca, Aeronca) 7AC, 7ACA, S7AC (L-16A), 7BCM (L-16B), 7CCM, 7DC, S7DC, 7EC, S7EC, 7ECA, 7FC, 7GC, 7GCA, 7GCCA, 7GCB, 7GCC, 7HC, 7J, 7KC, 7KCB, 8KCAB, 8KCB, 8GCB, 11AC, 111AC, 11BC, 111BC, 11CC, and S11CC</td>
<td></td>
</tr>
<tr>
<td>Bellanca Aircraft Corporation Models 14-9, 14-9L, 14-12F-3, 14-13, 14-13-2,</td>
<td></td>
</tr>
<tr>
<td>Aircraft Model Numbers</td>
<td>Aircraft Manufacturers and Models</td>
</tr>
<tr>
<td>------------------------</td>
<td>----------------------------------</td>
</tr>
</tbody>
</table>
Clark Aircraft, Inc. Models 12 and 1000  
Falcon Aircraft Corporation Model F-1  
Flug und Fahrzeugwerke AG Model AS 202/15 “Brand”  
Found Brothers Model FBA-2C  
Fuji Heavy Industries Models FA-200-160, FA-200-180, and FA-200-180AO  
Funk Aircraft Model Funk C  
Kearns, Edward Scott (Garcia, Henry S.) Model (Emigh) Trojan A-2  
Swift Museum Foundation, Inc. Model (Globe) GC-1A, GC-1B  
Goodyear Aircraft Model GA-22A  
Great Lakes Aircraft Model 2T-1A-1 and 2T-1A-2  
Commander Aircraft (Gulfstream) Models 112, (112A, 112B, 112TC, 112TCA, 114, and 114A)  
C. Itoh Aircraft Maintenance & Engineering Co. LTD. Model N-62  
Jamieson Corporation Model J-2-L1B  
Jodel, Avion Models D-140-B, DR-1050, D-1190, and 150  
Lake Models C-1, C-2-IV, LA-4, LA-4-200, and LA-4-250  
Luscombe Aircraft Corp. Models 8, 8A, 8B, 8C, 8D, 8E, 8F, T-8F, and 11A  
Maule Aerospace Technology Corp. Models Bee Dee M-4, M-4, M-4C, M-4S, M-4T, M-4-180C, M-4-180S, M-4-210, M-4-201C, M-4-210S, M-4-210T, M-4-220S, M-4-220T, M-5-180C, M-5-200, M-5-210C, M-5-210TC, M-5-T-220C, M-5-235, M-5-235C, M-6-180, M-6-235, M-7-235, MX-7-180, MX-7-235  
Nardi S.A. Model FN-333  
Jimmie Thompson Enterprise (Navion Rangemaster Aircraft Corporation) Models Navion (L-17A) Navion A (L-17B, L-17C), Navion B, D, E, F, G, and H  
White International Ltd. Models (Pitts) S-1S, S-1T, S-2, and S-2A  
Procaer S.P.A. Models F 15/B, F 15/C, and F 15/E  
Gulfstream Aerospace Corporation (Rockwell) Models 111, 112, 112B, 112TC, 112TCA, and 114  
Socata - Groupe Aerospatiale Models Rallye Series MS880B, MS885, MS892-A-150, MS892E-150, MS893A, MS893E, MS894A, MS894E, TB9, TB10, and TB21  
Stinson Models 108-2 and 108-3  
Sud Aviation Models Gardan GY.80-1500, GY.80-160, and GY.80-180  
Taylorcraft Aircraft Company Models F19, F21, and F21A  
Augustair, Inc. (Varga Aircraft Corporation) Models 2150, 2150A, and 2180 |

**NOTE 1:** The above list includes the aircraft where the Precise Flight, Inc. Model SVS III standby vacuum systems could be installed through STC. This list is not meant to be comprehensive.
exhaustive nor does it include all aircraft with the systems installed through field approval.

NOTE 2: This AD applies to any aircraft with a standby vacuum system installed that is identified in the preceding applicability provision, regardless of whether it has been modified, altered, or repaired in the area subject to the requirements of this AD. For aircraft that have been modified, altered, or repaired so that the performance of the requirements of this AD is affected, the owner/operator must request approval for an alternative method of compliance in accordance with paragraph (e) of this AD. The request should include an assessment of the effect of the modification, alteration, or repair on the unsafe condition addressed by this AD; and, if the unsafe condition has not been eliminated, the request should include specific proposed actions to address it.

Compliance: Required as indicated in the body of this AD, unless already accomplished.

To detect and correct problems with the standby vacuum system before failure or malfunction and to provide operating procedures for the pilot regarding the use and limitations of this system, accomplish the following:

(a) Within the next 30 calendar days after the effective date of this AD, accomplish whichever (paragraph (a)(1) or (a)(2) below) of the following that applies:

1) For airplanes with the affected standby vacuum system installed in accordance with the applicable STC, incorporate the applicable Precise Flight, Inc. Airplane Flight Manual Supplement (AFMS) for Standby Vacuum Systems (each document corresponds with the applicable STC as presented in the chart below) into the Airplane Flight Manual (AFM), including installing all placards specified in these AFMS's; or insert a copy of the Appendix to this AD into the AFM, including installing all placards specified in the Appendix:

<table>
<thead>
<tr>
<th>Applicable STC</th>
<th>AFMS Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA2160NM</td>
<td>May 7, 1998</td>
</tr>
<tr>
<td>SA2161NM</td>
<td>August 6, 1998</td>
</tr>
<tr>
<td>SA2162NM</td>
<td>August 6, 1998</td>
</tr>
<tr>
<td>SA2163NM</td>
<td>August 6, 1998</td>
</tr>
<tr>
<td>SA2164NM</td>
<td>August 6, 1998</td>
</tr>
<tr>
<td>SA2166M</td>
<td>August 6, 1998</td>
</tr>
<tr>
<td>SA2167NM</td>
<td>August 6, 1998</td>
</tr>
<tr>
<td>SA2168NM</td>
<td>August 6, 1998</td>
</tr>
<tr>
<td>SA2683NM</td>
<td>August 6, 1998;</td>
</tr>
</tbody>
</table>

2) For airplanes with the affected standby vacuum system installed through field approval, insert the Appendix to this AD into the AFM, including installing all placards specified in the Appendix.

(b) Within the next 12 calendar months after the effective date of this AD, and thereafter at intervals specified in the following paragraphs, inspect the push-pull cable, vacuum lines, saddle fittings, and shuttle valve for correct installation and damage (wear, chafing, deterioration, etc.). Accomplish these inspections in accordance with Precise Flight Instructions for Continued Airworthiness (Section 3.3 of Installation Report No. 50050), Revision 25, dated August 26, 1996.

1) Reinspect the push-pull cable, vacuum lines, and saddle fittings at intervals not to exceed 12 calendar months; and
(2) Reinspect the shuttle valve at intervals not to exceed 24 calendar months.

(c) Prior to further flight after each inspection required by paragraph (b) of this AD, accomplish the following in accordance with Precise Flight Instructions for Continued Airworthiness (Section 3.3 of Installation Report No. 50050), Revision 25, dated August 26, 1996.

(1) Correct any discrepancy found; and

(2) Conduct a function test of the vacuum system and assure proper function.

(d) Special flight permits may be issued in accordance with sections 21.197 and 21.199 of the Federal Aviation Regulations (14 CFR 21.197 and 21.199) to operate the airplane to a location where the requirements of this AD can be accomplished.

(e) An alternative method of compliance or adjustment of the initial or repetitive compliance times that provides an equivalent level of safety may be approved by the Manager, Seattle Aircraft Certification Office (ACO), 1601 Lind Avenue, SW, Renton, Washington 98055-4065. The request shall be forwarded through an appropriate FAA Maintenance Inspector, who may add comments and then send it to the Manager, Seattle ACO.

NOTE 3: Information concerning the existence of approved alternative methods of compliance with this AD, if any, may be obtained from the Seattle ACO.

(f) The inspections, corrections, and test required by this AD shall be done in accordance with Precise Flight Instructions for Continued Airworthiness (Section 3.3 of Installation Report No. 50050), Revision 25, dated August 26, 1996. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from Precise Flight, Inc., 63120 Powell Butte Road, Bend, Oregon 97701. Copies may be inspected at the FAA, Central Region, Office of the Regional Counsel, 901 Locust, Room 506, Kansas City, Missouri 64106, or at the Office of the Federal Register, 800 North Capitol Street, NW, suite 700, Washington, DC.

(g) This amendment becomes effective on January 14, 2000.

APPENDIX TO AD 99-24-10
SYSTEM DESCRIPTION

A. Precise Flight Standby Vacuum System may be installed to provide a temporary vacuum system in the event of a primary vacuum failure. The Standby Vacuum System operates on the differential between the intake manifold and ambient air pressure and is directed through a shuttle valve system to drive your flight instruments.

I. OPERATING LIMITATIONS

A. INSTRUCTIONS

1. The Standby Vacuum System is for emergency or standby use only and not for dispatch purposes.

2. Vacuum powered and/or Vacuum gyro directed autopilot operation may be unreliable when the Standby Vacuum System is the sole source of vacuum. Vacuum powered or vacuum gyro directed autopilot should be OFF when operating with a failed primary vacuum system.

3. The Supplemental Vacuum System is not designed to operate pneumatic de-ice systems. DO NOT operate a pneumatic de-ice system when operating with a failed primary vacuum system.

4. Above 10,000 ft. pressure altitude, engine power settings may have to be significantly reduced to provide adequate vacuum power for proper gyro instrument operation.

5. The following placards are required to be in full view of pilot:
OPERATING LIMITATIONS (CONT.)

B. PLACARDS

Placard to be located on the push/pull control cable

Full
Stby
Vac
On

Placard to be located around the LED for the pump inop warning light.

Instrument
Source
Pump Inop
Warning

Placard to be placed in front and in full view of the pilot.

STANDBY VACUUM SYSTEM EQUIPPED: FOR OPERATING INSTRUCTIONS AND LIMITATIONS SEE SUPPLEMENT IN OWNERS MANUAL OR PILOTS OPERATING HANDBOOK
I. OPERATING LIMITATIONS (CONT.)

B. PLACARDS

One of the following placards must be placed in full view of the pilot near the instrument vacuum indicator after appropriate entries have been made.

Approximate Standby Vacuum Available - Altitude - Power Chart for aircraft with Constant Speed Propeller - Maximum Continuous RPM.

<table>
<thead>
<tr>
<th>PRESS ALT. (FT.)</th>
<th>RPM</th>
<th>MAN. PRESSURE</th>
<th>SYS VACUUM IN. HG MIN.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>Max. Cont.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4000</td>
<td>Max. Cont.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6000</td>
<td>Max. Cont.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8000</td>
<td>Max. Cont.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10,000</td>
<td>Max. Cont.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Approximate Standby Vacuum Available - Altitude - Power Chart for aircraft with a Fixed Pitch Propeller.

<table>
<thead>
<tr>
<th>PRESS ALT. (FT.)</th>
<th>RPM</th>
<th>SYS VACUUM IN. HG MIN.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6000</td>
<td></td>
<td></td>
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<tr>
<td>8000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
II. OPERATING PROCEDURES

A. NORMAL PROCEDURES

1. GROUND CHECK

   a. Cycle the Standby Vacuum Control Knob OUT - ON - and return Control Knob IN - OFF - position.

2. BEFORE TAKEOFF

   a. Idle Engine at low speed, momentarily pull the standby vacuum knob out - ON - and check vacuum gauge. Normally, the vacuum reading will be slightly higher. After checking system push Standby Vacuum System knob IN - OFF -. Check that vacuum gauge has returned to the previous reading.

3. ENROUTE

   a. Regularly check vacuum gauge and monitor warning light for proper vacuum system operation.
B. EMERGENCY PROCEDURES

1. PRIMARY VACUUM FAILURE WARNING LIGHT ILLUMINATES

   a. Pull the Standby Vacuum System knob OUT -ON- and adjust
target setting as required to maintain adequate vacuum for the
primary instruments. Suction Gauge Reading is in the Green Arc.
   If necessary descend to a lower altitude to obtain a larger
differential between manifold and ambient pressure. Vacuum
power must be closely monitored by checking the vacuum gauge
frequently.

   b. The SVS is not designed for continued IFR flight. Immediate steps
should be taken to return to VFR conditions or to land. If this is
not possible, IFR flight should be continued only as long as
necessary to return to VFR conditions or land the airplane.

   WARNING: FAILURE OF THE VACUUM SYSTEM STILL
CONSTITUTES AN EMERGENCY SITUATION
REGARDLESS OF THE INSTALLATION OF THE SVS. IT
MAY NOT BE POSSIBLE TO MAINTAIN A SAFE
ALTITUDE AND MAKE USE OF THE SVS. IN SUCH A
SITUATION THE AIRPLANE MUST BE FLOWN USING
NON-VACUUM POWERED INSTRUMENTS.

   c. If descent is impractical:

      • Periodically and temporarily reduce power as required to
        provide adequate vacuum to the aircraft primary
        instruments.

      • Reapply power as required, while comparing vacuum
        driven gauges against the Turn and Bank Indicator, Turn
        Coordinator, VSI and/or other flight instruments.

      • When an obvious discrepancy is noted between the vacuum
gauged instruments and other flight instruments,
        Periodically and temporarily reduce power as required to
        provide adequate vacuum to the aircraft primary
        instruments.

III. PERFORMANCE

   NO CHANGE