

Mogas STC supplement

Supplement for Flight manual

for

PA 28-160 s/n 28-1760,28-1761 thru 28-4377
PA 28-161 s/n 28-7716001 thru 28-8116001 and higher
PA 28-180 s/n 28-671 thru 28-1760, 28-1761 thru 28-5859, 28-7105001 thru 28-7505261
PA 28-181 s/n 28-7690001 thru 29-7990626, 28-8090001 thru 8590001 and higher.

Registration: ~~PH-EAH~~ **O-EKEG** Serial nr : 28-7990455

This supplement has to be joined to the official approved flight manual of above mentioned aircraft when the aircraft becomes modified by **EMZ-Nr.: SA 1231**

The information contained herein supplements or supersedes the original flight manual only in those areas listed herein. For limitations, procedures and performance information not contained in this supplement, consult the original flight manual.

Limitations

Fuel: Supplement to the in the original flight manual mentioned approved fuels are :

Unleaded automotive fuel following DIN EN 228 ROZ 98

~~Unleaded automotive fuel according ASTM Specifications D-439 with an~~
Antiknock index of minimal 91 octane (ROZ + MOZ)/2

Leaded automotive fuel according following ASTM specification D-439 with an Antiknock index of minimal 91 octane (ROZ + MOZ)/2

The mixture with AVGAS aircraft fuel is approved.

Remark: **Only fuel with an alcohol percentage of maximal 1% may be used !**
When this information is not available respectively this fuel is not available, AVGAS must be used for refuelling. (according the information of the flight manual)
Fuel following DIN EN 228 can contain to 5% alcohol.

Placards : Near existing Avgas placards at each fuel servicing port is an placard with the following text

Unloaded Automotive Gasoline
Minimal 98 RON
According DIN EN 228 or
FAA STC

Alcohol percentage max. 1%
Intermixing with AVGAS approved

On instrument panel, in full view of the pilot, place the following placard :

Takeoff and Landing on
Right tank when operating
with auto gas

Normal Procedures :

Fuel tank usage : Use Right tank for Takeoff and Landing when operating on auto gas, including when auto gas is intermixed with AVGAS 100 LL.

Fuel Management : The fuel tank usage shall be planned so that, when operating on auto gas and an Outside Air Temperature (OAT) of more than 30 degrees, the fuel quantity is no less than $\frac{1}{4}$ of fuel quantity for normal operation.

Auxiliary fuel Pumps : There are 2 electric auxiliary fuel pumps (nr. 1 and nr. 2) installed, they can be controlled by an electric switch on the instrument panel.

Either pump nr. 1 or pump nr. 2 must be ON by taxi, takeoff, climb and landing (electric switch ON). During cruise operations, provided proper fuel pressure values are maintained, the pump can be switched OFF. (~~electric switch OFF~~). See limitations in original flight manual. For even wear of the pumps, for the interest of pump failure, use pump nr. 1 and nr. 2 alternately.

Function check on the pumps before starting engine : Set Master switch ON and turn ON pump nr. 1 and nr. 2 one at a time. Check function by listening for pump operation and proper fuel pressure is obtained. Turn OFF the pumps.

Emergency Procedures :

If for any reason, fuel quantity on the Right tank is less than $\frac{1}{4}$ of its quantity, landing on the Left tank may be accomplished.



Anhang zum Flughandbuch für

9 5 3 2 9 2 3

- PA-28 - 160** W-Nr. 28-671 bis 28-1760 , 28-1761 bis 28 - 4377
PA-28 - 161 W-Nr. 28-7716001 bis 28-8116001 und höher
PA-28 - 180 W-Nr. 28-671 bis 28-1760, 28-1761 bis 28-5859,
28-7105001 bis 287505261
PA-28 - 181 W-Nr. 28-7690001 bis 28-7990626, 28-8090001 bis 28-8590001 u. höher

Kennzeichen: ~~PH-EAH~~ O-EXEG

Werk-Nr.: 28-7990445

Dieser Anhang muss dem offiziell genehmigten Flughandbuch des oben eingetragenen Flugzeugs beigelegt sein, wenn das Flugzeug durch EMZ-Nr.: SA 1231 modifiziert wurde. Die in diesem Anhang enthaltenen Informationen ergänzen oder ersetzen diejenigen des Originalhandbuches nur in den folgenden Bereichen. Für Beschränkungen, Verfahren und Leistungsangaben, die in diesem Anhang nicht enthalten sind, ist das Originalhandbuch zu konsultieren.

Beschränkungen / Limitations

Kraftstoff: Zusätzlich zu den im Original-Flughandbuch aufgeführten Kraftstoffen sind folgende Kraftstoffe zugelassen:

Unverbleiter Automobilkraftstoff nach DIN EN 228 ROZ 98
Unverbleiter Automobilkraftstoff gemäß ASTM Spezifikation D-439 mit einem Antiknockindex von mindestens 91 Oktan (ROZ+MOZ)/2

Verbleiter Automobilkraftstoff gemäß ASTM Spezifikation D-439 mit einem Antiknockindex von mindestens 91 Oktan (ROZ+MOZ)/2

Das Mischen mit AVGAS Flugzeugkraftstoff ist gestattet.

Anmerkung: *Es dürfen nur Kraftstoffe mit einem Alkoholgehalt von maximal 1% verwendet werden! Falls diese Information nicht vorliegt bzw. dieser Kraftstoff nicht verfügbar ist, muss AVGAS getankt werden (entsprechend den Angaben des Flughandbuches).*

Kraftstoff nach DIN EN 228 kann bis zu 5 % Alkohol enthalten !

Beschriftung: Neben den bestehenden AVGAS-Beschriftungen ist an jeder Tankeinfüllöffnung ein Aufkleber mit dem folgenden Text anzubringen:

Unverbleites Autobenzin
Minimum 98 ROZ
nach DIN EN 228 oder gemäß FAA
STC

Alkoholgehalt max 1 %
Mischen mit AVGAS gestattet

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FOR TRANSLATION!



9532923

Am Instrumentenbrett , im direkten Blickfeld des Piloten ist folgendes Hinweisschild anzubringen:

**Start und Landung nur auf Tank
RECHTS
bei Betrieb mit Autobenzin**

Normalverfahren / Normal Procedures

- Tankwahlschalter** : Start und Landung auf Tank rechts durchführen ,wenn Autobenzin oder ein Gemisch aus Autobenzin und AVGAS 100 LL verwendet wird.
- Kraftstoff – Planung** : Die Tankwahlschaltung soll so gewählt werden , dass bei Verwendung von Autobenzin und einer Aussentemperatur (OAT) von mehr als 30° C ein Kraftstoff-Vorrat von mindestens ¼ des Behältervolumens für den normalen Betrieb verbleibt.
- Kraftstoff-Zusatzpumpen** : Es sind 2 elektrisch betriebene Zusatzpumpen (nr. 1 und Nr. 2) eingebaut , die durch Schalter am Instrumentenbrett eingeschaltet werden.
- Eine dieser Pumpen muss bei Rollen , Start , Steigflug oder Landung eingeschaltet sein (Schalter ON). Während des Reisefluges , ausreichender Kraftstoffdruck vorausgesetzt , kann diese Pumpe ausgeschaltet werden (Schalterstellung OFF). Vgl. auch **Beschränkungen / Limitations** im Originalhandbuch des Flugzeuges.
Zur gleichmässigen Nutzung der Pumpen im Interesse der Betriebssicherheit wird die wechselweise Verwendung der Pumpen empfohlen.
- Funktionskontrolle der Pumpen vor dem Anlassen** : Batterie-Hauptschalter einschalten und die Pumpen Nr. 1 und Nr. 2 nacheinander einschalten . Jeweils Funktion durch Hören des Pumpenlaufgeräusches und des Kraftstoffdruckes jeder Pumpe überprüfen. Pumpe wieder ausschalten.

Notverfahren / Emergency Procedures

Falls aus unbekanntem Gründen der Kraftstoffvorrat im rechten Tank weniger als ¼ sein sollte , kann ausnahmsweise die Landung mit dem linken Tank ausgeführt werden.

Vom Luftfahrt-Bundesamt genehmigt:

Datum: **17. Juni 02**



**ZOZ
FOR TRANSLATION!**

Petersen Aviation, Inc.
984 K Road
Minden, Nebraska 68959

Supplement No. 2

9532923

FAA APPROVED

AIRPLANE FLIGHT MANUAL SUPPLEMENT

FOR

Piper PA-28 Series Aircraft

See Applicable Model and Serial Number List

Registration Number ~~PH-EAH~~ D-EXEG

Serial Number 28-7990445

This Supplement must be attached to the FAA Approved Airplane Flight Manual applicable to that particular airplane when the airplane has been modified in accordance with STC SA2660CE. The information contained herein supplements or supersedes the basic manual only in those areas listed herein. For limitations, procedures and performance information not contained in this supplement, consult the basic Airplane Flight Manual.

FAA APPROVED



for
Margaret Kline, Manager
Aircraft Certification Office
Federal Aviation Administration
Wichita, Kansas

FAA Approved: October 17, 1990
Revision A: April 29, 2005

Page 1 of 7

Petersen Aviation, Inc.
984 K Road
Minden, NE 68949

9532923

Log of Revisions

Revision	Date	Description	Page	*FAA Approved by
None	October 17, 1990	Original Issue	Pages 1 thru 3	E.L. Bollin
(A)	April 29, 2005	Revised All Pages Added Log of Revisions	Pages 1 thru 7	<i>DM Baker</i>

*Manager
Aircraft Certification Office
Federal Aviation Administration
Wichita, Kansas

FAA Approved: October 17, 1990
Revision A: April 29, 2005

1. **Limitations Section:**

Fuel:

The use of leaded and unleaded automotive gasoline, 91 minimum antiknock index (RON+MON)/2 per ASTM Specification D-439, D-4814 or EN 228 are approved. Intermixing with aviation gasoline is also approved.

DO NOT use 82UL Aviation Gasoline or mixtures with 82UL.
DO NOT use fuel that contains alcohol.

Fuel Management:

Use Right tank for takeoff and landing when operating on auto gas, including when autogas is intermixed with aviation gasoline. This is **critical** when outside ambient temperatures are 85°F or higher.

When operating with auto gas, fuel tank usage shall be planned such that sufficient fuel (no less than 1/4 full indication) remains in the Right tank for all normal operations. This is **critical** when outside ambient temperatures are 85°F or higher.

Placards:


1. Part No. V674903-28, Item 12/24-9 on the instrument panel in full view of the pilot:

TAKEOFF AND LANDING ON RIGHT TANK WHEN OPERATING WITH AUTO GAS

12 & 24 Volt Systems:

Limitations Section: CONT'D

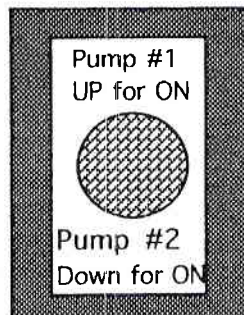
Placards: 2. Part No. V674903-91 Item 12/24-33 near existing Avgas placards at each fuel servicing port:

Fuel: Unleaded or Leaded Automotive Gasoline 91 minimum antiknock index, (RON+MON)/2 per ASTM D-439 and D-4814. Intermixing with 100 Aviation Gasoline also approved. 

NOT APPROVED FOR USE OF 82UL AVIATION GA
OR MIXTURES WITH 82UL.
DO NOT USE 82UL AVIATION GASOLINE
OR MIXTURES WITH 82UL.
DO NOT USE FUEL THAT CONTAINS ALCOHOL

12 & 24 Volt Systems:

3. Part/Item No. 12/24-15 on the instrument panel around the electric fuel pump toggle switch:



12 Volt & 24 Volt Systems:

4. Part/Item No. 24-27 located on the instrument panel in full view of the pilot:

Refer to the Airplane Flight Manual Supplement for procedures when operating with auto gas.

12 Volt & 24 Volt Systems:

Limitations Section: CONT'D

Placards: Circuit Breaker Placards

Item 24-35

Converter
A

Item 24-36

Converter
B

Item 12/24-10

Fuel Pump
A

Item 12/24-7

Fuel Pump
B

Item 24-12

Engine
Primer

The five placards specified above are used to mark the circuit breakers on the instrument panel.

12 Volt airplanes - Use Item 12/24-10 & 12/24-7 only.

24 Volt Electrically

Primed: Use all five placards listed above.

24 Volt Manually

Primed: Use four circuit breakers placards. Item 24/12 is NOT used.

2. PROCEDURES SECTION:

Emergency Procedures 12 & 24 Volt Airplanes

Fuel Management

If for any reason, fuel quantity on the Right tank is nearly depleted (less than 1/4 of full indication) landing may be accomplished on the Left tank.

Fuel System:

Fuel Pump Failure

12 & 24 Volt Airplanes - These airplane are equipped with two separate electric fuel Pumps. If one Pump fails, throw the three way fuel Pump switch to engage the second, redundant electric fuel Pump. If the other electric fuel pump is also inoperative:

Check to make sure the Master switch is ON.

24 Volt Airplanes: Check circuit breakers.

12 Volt Airplanes: Check circuit breakers.

Reset the circuit breakers if no gasoline fumes are noted.

If resetting the circuit breakers fails to correct the problem and if the engine is operating normally, continue flight to destination. Determine the source of the fault before further flight.

If the engine is running rough or not at all, lower the nose, reduce throttle setting to 75% or less, make Mixture RICH, Carb Heat ON, switch fuel tanks. Choose a suitable off airport landing location or if possible continue flight to the nearest airport.

Abnormal Procedures: 24 Volt Airplanes:

Fuel System

The circuit breakers protect the wiring to the fuel pumps and to the voltage converters. If a fuel pump failure should occur, check all circuit breakers because a "tripped" circuit breaker for a converter will in turn cause its associated pump to be inoperative.

Normal Procedures: 12 & 24 Volt Airplanes

Fuel Management:

Use Right tank for takeoff and landing when operating on auto gas, including when autogas is intermixed with aviation gasoline. This is **critical** when outside ambient temperatures are 85°F or higher.

When operating with auto gas, fuel tank usage shall be planned such that sufficient fuel (no less than 1/4 full indication) remains in the Right tank for all normal operations. This is **critical** when outside ambient temperatures are 85°F or higher.

PROCEDURES SECTION: CONT'D

Normal Procedures: 12 & 24 Volt Airplanes

Fuel System:

Auxiliary Fuel Pumps:

There are two pumps, Pump A and Pump B controlled by an electric switch on the pilot's instrument panel. Either Pump A or Pump B must be ON for takeoff, landing, ground taxi and climb operations. The selected fuel pump may be turned OFF (center position) during cruise operations provided proper fuel pressure values are maintained (See Limitations Section in basic Airplane Flight Manual). It is recommended that Pump A and Pump B be used alternately to obtain approximately even usage.

Before starting engine:

- 1) With Master switch ON, check auxiliary fuel pumps, Pump A and Pump B one at a time as follows:
 - a. Listen for pump operation
 - b. Verify proper fuel pressure is obtained.
- 2) Turn fuel pumps OFF

Engine Priming:

To prime the engine before starting:

- 1) Aircraft equipped with manual engine priming pump - following engine priming, make certain that the primer pump is in the closed and locked position (pushed in and rotated till locked) before activating a fuel pump or starting the engine.
- 2) Aircraft equipped with electric engine priming system:
 - a. Turn Master Switch ON
 - b. Turn fuel selector switch to the Right tank.
 - c. Depress the electric priming switch with the one hand.
(this opens the primer solenoid valve)
 - d. While depressing the fuel primer solenoid valve switch, throw the fuel pump toggle switch either up or down with the other hand to activate one Pump.
 - e. Run the pump for only a short time (one to three seconds)
 - f. Shut the pump off and release electric priming solenoid switch.
 - g. Start the engine.
 - h. After the engine starts, activate either the Pump A or Pump B switch so that a fuel pump remains on for taxi, takeoff, and climb.

Manual or Electrically Primed: After the engine starts and during warm up, allow the engine to run with the electric fuel pumps off to verify that the engine driven fuel pump is operating properly. Before taxi activate either Pump A or Pump B so that one of the electric fuel pumps remains on for taxi, takeoff, and climb.

-----END-----

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SERVICE INSTRUCTION

DATE: April 24, 2013

Service Instruction No. 1070S
(Supersedes Service Instruction No. 1070R)
Engineering Aspects are
FAA Approved

SUBJECT: Specified Fuels for Spark Ignited Gasoline Aircraft Engine Models
MODELS AFFECTED: Lycoming engine models as detailed in Table 3
TIME OF COMPLIANCE: When refueling aircraft

NOTE

Incomplete review of all the information in this document can cause errors. Read the entire Service Instruction to make sure you have a complete understanding of the requirements.

This Service Instruction identifies approved fuels that can be used when refueling aircraft with Lycoming engines. Fuels no longer known to be in production and distribution have been removed from this Service Instruction. For historical information, refer to the engine model Type Certificate Data Sheet or previous revisions of this Service Instruction.

Fuels approved for use in Lycoming engines include the following types:

- Aviation Fuels (Table 1)
- Automotive Fuels (Table 2)

⚠ CAUTION

ANY MIXTURE OF UNAPPROVED FUELS AND ADDITIVE MATERIALS THAT MAKES A LOWER THAN SPECIFIED OCTANE RATING, CAN CAUSE ENGINE DAMAGE. USE OF LOWER-THAN-SPECIFIED OCTANE FUEL COULD CAUSE DETONATION AND MECHANICAL DAMAGE TO THE ENGINE.

⚠ CAUTION

IF INCORRECT FUEL OR ADDITIVES ARE USED, REFER TO THE LATEST REVISION OF SERVICE BULLETIN NO. 398 FOR INSTRUCTIONS TO CORRECT THE FUEL CONTAMINATION.



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Fuel Specifications and Grades

Specifications that identify fuel types and grades approved for Lycoming engines are listed in Table 1: *Aviation Fuel Specifications and Fuel Grades* and Table 2: *Automotive Fuel Specifications and Fuel Grades*.

Engine Fuel Approvals

Table 3: *Fuels Approved for Use in Lycoming Engine Models* identify approved fuels for each Lycoming engine model.

Although the aviation and automotive fuels identified in Table 1 and Table 2 can be used as designated in Table 3, airframe approval is necessary. Refer to the Pilot Operating Handbook (POH), Type Certificate Data Sheet or Supplemental Type Certificated (STC) for aircraft approved fuels.

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**Table 1
Aviation Fuel Specifications and Fuel Grades**

	Fuel Specification	Fuel Grades	Color
LEADED	<u>ASTM D910:</u> <i>Standard Specification for Aviation Gasolines</i>	100 100LL 100VLL	Green Blue Blue
	<u>TU 38.5901481-96:</u> <i>High-Octane Gasoline for Gasoline Engines</i> Ukrainian National Standard	91	Yellow
	<u>GOST 1012-72:</u> <i>Aviation petrol</i> Russian National Standard	B91/115 B95/130	Green Amber
UNLEADED	<u>ASTM D7547:</u> <i>Standard Specification for Unleaded Aviation Gasolines</i>	UL 91	Clear to Yellow (no dye)
	<u>HJELMCO Oil, INC.:</u> HJELMCO 91/96 UL is the registered trade name for colorless unleaded fuel made by HJELMCO Oil, Inc. of Sollentuna, Sweden	HJELMCO 91/96 UL	Clear to Yellow (no dye)



WHEN USING THE UNLEADED FUELS IDENTIFIED IN TABLE 1, LYCOMING OIL ADDITIVE P/N LW-16702, OR AN EQUIVALENT FINISHED PRODUCT SUCH AS AEROSHELL 15W-50, MUST BE USED.

NOTE

Isopropyl alcohol in amounts not to exceed 1% by volume can be added only to **aviation fuel** (not automotive fuel) to prevent ice formation in fuel lines and tanks. Although approved for use in Lycoming engines, do not use isopropyl alcohol in the aircraft fuel systems unless approved by the aircraft manufacturer.

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**Table 2
Automotive Fuel Specifications and Fuel Grades**

FUEL SPECIFICATION	FUEL GRADES*
<p><u>ASTM D4814-09b:</u> <i>Standard Specification for Automotive Spark-Ignition Engine Fuel</i> Ordering Requirements: Vapor Pressure: Class A-4 Oxygenate Content: For blends containing one or more oxygenates, oxygenate content shall not exceed 1.0 volume percent. Prohibited Oxygenates: Ethanol, Methanol</p>	<p>91 AKI 93 AKI</p>
<p><u>EN 228:2008(E):</u> <i>Automotive fuels - Unleaded petrol - Requirements and test methods</i> Ordering Requirements: Vapor Pressure: Class A Oxygenate Content: For blends containing one or more oxygenates, oxygenate content shall not exceed 1.0 volume percent. Prohibited Oxygenates: Ethanol, Methanol</p>	<p>NB 3 93AKI</p>

 CAUTION

IN COMPLIANCE WITH THIS SERVICE INSTRUCTION, THE AUTOMOTIVE FUEL MUST AGREE WITH ALL SPECIFICATIONS IN TABLE 2. UNLEADED AUTOMOTIVE GASOLINE THAT IS NOT IN CONFORMANCE WITH THE SPECIFICATIONS IN TABLE 2 IS NOT TO BE USED.

 CAUTION

WHEN USING THE UNLEADED AUTOMOTIVE FUELS IDENTIFIED IN TABLE 2, LYCOMING OIL ADDITIVE P/N LW-16702, OR AN EQUIVALENT FINISHED PRODUCT SUCH AS AEROSHELL 15W-50, MUST BE USED.

NOTE

Refer to the latest revision of Service Instruction No. 1534 for information on service recommendations for long-term storage of engines that use automotive fuel.

The clear to yellow (colorless) unleaded automotive fuels in Table 2 must be in conformance with ASTM D4814-09b or EN 228:2008:E. In these specifications, the automotive fuel is identified by an Anti-Knock Index (AKI) or in the case of EN 228 Super Premium, a grade designation. The AKI is an octane rating and is the arithmetic average of the Research Octane Number (RON) and Motor Octane Number (MON).

$$(RON + MON)/2 = AKI$$

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Automotive fuels usually have Reid Vapor Pressure (RVP) values between 7 and 9.3 psi (48 and 64 kPa) in summer seasons but specifications for the RVP can be as high as 15 psi (103 kPa) in the winter. In some geographic regions, there is no upper limit to RVP in the winter season. As vapor pressure increases, the tendency for vapor lock will increase as well as fuel "boil off" at altitude. It is also possible that ethanol-based fuels could not be compatible with some fuel system components. In cases of material incompatibility, deterioration of metallic and non-metallic components can occur. Therefore, fuels containing ethanol are not approved in this Service Instruction.

Automotive ground transportation fuels available direct to consumers (e.g. "pump gas") usually do not have labels with sufficient information to identify compliance with the requirements in Table 2. While indicated octane is generally necessary for display at retail points of sale, octane rating methods, fuel vapor pressure, oxygenate content and ethanol content can vary widely and are generally known only at the wholesale terminal.

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**Table 3
Fuels Approved for Use in Lycoming Engine Models**

Engine Models	Leaded Aviation Fuels (Table 1)				Unleaded Aviation Fuels (Table 1)		Unleaded Automotive Fuels (Table 2)	
	ASTM: D910	TU 38	GOST 1012		ASTM D7547	HJELMCO	ASTM D4814	EN228
	100* 100LL 100VLL	91*	B91/115*	B95/130*	UL 91	91/96	91 AKI	93 AKI NB.3
O-235								
-C, -E, -H	•	•	•	•	•	•	•	•
-F, -G, -J	•							
-K, -L, -N	•				•		•	•
-M, -P	•				•		•	•
O-290								
-D	•	•	•	•	•	•	•	•
O-320								
-A, -B, -C, -D, -E	•	•	•	•	•	•	•	•
-H	•							
IO-320								
-A, -B, -D, -E	•	•	•	•	•	•	•	•
-C, -F	•							
AIO-320								
-A, -B, -C	•	•	•	•	•	•	•	•
LIO-320								
-B	•	•	•	•	•	•	•	•
-C	•							
AEIO-320								
-D	•	•	•	•	•	•	•	•
-E	•	•	•	•	•	•	•	•
O-360								
-A, -B, -C, -D, -F, -G, -J	•	•	•	•	•	•	•	•
-E	•							

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**Table 3 (Cont.)
Fuels Approved for Use in Lycoming Engine Models**

Engine Models	Unleaded Aviation Fuels (Table 1)				Unleaded Aviation Fuels (Table 1)		Unleaded Aviation Fuels (Table 1)		Unleaded Automotive Fuels (Table 2)	
	ASTM D910	TU 38	GOST 1012		ASTM D7547	HJELMCO	ASTM D4814	EN228	ASTM D4814	EN228
	100* 100LL 100VLL	91*	B91/115*	B95/130*	UL 91	91/96	91 AKI	93 AKI	91 AKI	NB.3
HO-360										
-A, -B	•	•	•	•		•		•		•
-C	•	•	•	•	•			•		•
LO-360										
-A, -C, -D, -F	•			•						
-J, -K	•									
-B, -E, -L, -M	•	•	•	•	•	•		•		•
LO-360										
-A	•	•	•	•	•	•		•		•
-E	•	•	•	•	•	•		•		•
TO-360										
-A, -C, -E, -F	•									
VO-360										
-A, -B	•	•	•	•		•				
AIO-360										
-A, -B	•			•						
HIO-360										
-A, -C, -D, -E, -F	•			•						
-B	•	•	•	•	•	•		•		•
-G	•	•	•	•	•	•		•		•
IVO-360										
-A	•	•	•	•	•	•		•		•
LIO-360										
-C	•			•						
-M	•	•	•	•	•	•		•		•

**Table 3 (Cont.)
Fuels Approved for Use in Lycoming Engine Models**

Engine Models	Leaded Aviation Fuels (Table 1)				Unleaded Aviation Fuels (Table 1)		Unleaded Automotive Fuels (Table 2)	
	ASTM D910	TU 38	GOST 1012		ASTM D7547	HJELMCO	ASTM D4814	EN228
	100* 100LL 100VLL	91*	B91/115*	B95/130*	UL 91	91/96	91 AKI 93 AKI	NB.3
LTO-360								
-A, -E	•							
TIO-360								
-A, -C	•							
AEIO-360								
-A	•			•				
-B, -H	•	•		•		•		
LHIO-360								
-C, -F	•							
IO-390								
-A	•			•				
AEIO-390								
-A	•							
O-435								
-A, -C	•	•		•	•	•		
GO-435								
-C, -C2 (See note below for -C2)	•	•		•	•	•		
NOTE: GO-435-C2 engine models equipped with carburetor setting 10-3391 must use 91/96 HJELMCO grade or better fuel. Engines equipped with carburetor settings 10-3391-1 or PS-5BD can use fuels specified for GO-435-C model engines.								
VO-435								
-A, -6, -23	•	•		•	•	•		
-B	•			•				

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**Table 3 (Cont.)
Fuels Approved for Use in Lycoming Engine Models**

Engine Models	Leaded Aviation Fuels (Table 1)			Unleaded Aviation Fuels (Table 1)		Unleaded Automotive Fuels (Table 2)	
	ASTM D910	TU 38	GOST 1012	ASTM D7547	HJELMCO	ASTM D4814	EN228
	100* 100LL 100VLL	91*	B91/115* B95/130*	UL 91	91/96	91 AKI 93 AKI	NB.3
TVO-435							
-A, -B, -C, -D, -E, -F, -G, -25	•						
O-480							
-1, -3	•						
-A	•	•	•		•		
GO-480							
-B, -D, -F	•	•	•	•	•		
-C, -G	•		•				
GSO-480							
-A, -B	•						
IGO-480							
-A	•		•				
IGSO-480							
-A	•						
O-540							
-A, -B, -E, -F, -G, -H, -J	•	•	•	•	•	•	•
-L	•						
-9, -9A	•						
IO-540							
-A, -B, -E, -G, -J, -K, -L, -M,	•		•				
-P, -R, -S, -U, -AA, -AC, -AE	•						
-C, -D, -N, -T, -V	•	•	•	•	•	•	•
-W, -AB, -AF	•			•		•	•

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11	09	62	04	24	13			S
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**Table 3 (Cont.)
Fuels Approved for Use in Lycoming Engine Models**

Engine Models	Leaded Aviation Fuels (Table 1)				Unleaded Aviation Fuels (Table 1)		Unleaded Automotive Fuels (Table 2)		
	ASTM D910	TU 38	GOST 1012		ASTM D7547	HJELMCO	ASTM D4814		EN228
	100* 100LL 100VLL	91*	B91/115*	B95/130*	UL 91	91/96	91 AKI	93 AKI	NB.3
VO-540									
-A, -B	•	•	•	•	•	•			
-C	•			•					
HIO-540									
-A	•			•					
IGO-540									
-A, -B	•			•					
IVO-540									
-A	•			•					
TIO-540									
-A, -C, -E, -F, -G, -H, -J, -N, -R, -S, -U, -V, -W, -AA, -AB, -AE, -AF, -AG -AH, -AJ, -AK	•								
TVO/TIVO-540									
-A	•								
AEIO-540									
-D	•	•							
-L	•								
IGSO-540									
-A, -B	•								
LTIO-540									
-F, -J, -N, -R, -U, -V	•								

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**Table 3 (Cont.)
Fuels Approved for Use in Lycoming Engine Models**

Engine Models	Leaded Aviation Fuels (Table 1)			Unleaded Aviation Fuels (Table 1)		Unleaded Automotive Fuels (Table 2)	
	ASTM D910	TU 38	GOST 1012	ASTM D7547	HJELMCO	ASTM D4814	EN228
	100*	91*	B91/115* B95/130*	UL 91	91/96	91 AKI 93 AKI	NB.3
TIO-541							
-A, -E	•						
TIGO-541							
-D, -E, -G	•						
IO-580							
-B	•		•				
AEIO-580							
-B	•		•				
IO-720							
-A, -B, -C, -D	•		•				

* - Continuous use of high lead fuels can cause increased lead deposits both in combustion chambers and spark plugs causing roughness in engine operation and scored cylinder walls. It is recommended that the use of this fuel be limited wherever possible. However, when high lead fuel is used, do periodic inspections of combustion chambers, valves, and valve ports more frequently and rotate or clean spark plugs whenever lead fouling is found. See the latest revision of Service Letter No. L192.

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