LYCOMING
A Textron Company

652 Oliver Street
Williamsport, PA 17701 U.S.A.

Tel. 570-323-6181
Fax. 570-327-7066
www.lycoming.textron.com

SERVICE INSTRUCTION

DATE: March 7, 2002

Service Instruction No. 1070M
(Supersedes Service Instruction No. 1070L)
Engineering Aspects are
FAA Approved

SUBJECT: Specified Fuels

MODELS AFFECTED: Textron Lycoming opposed series aircraft engines.

TIME OF COMPLIANCE: When refueling aircraft.

A low lead content fuel, currently designated "100LL" has been available since the discontinuance of leaded commercial grades 91/96 and 115/145 fuels and the limited availability of 80/87 grade in U.S. as well as overseas countries. Also, the colorless unleaded fuel, currently designated 91/96 UL is in use in a limited area of Europe. Fuels currently designated B91/115 and B95/130 are available for use in the CIS (Commonwealth of Independent States). Fuel currently designated 91 is available for use in the Ukraine. A summary of current grades as well as the previous fuel designations is shown in the following list.

FUEL GRADE LIST

Original Fuel Grades (ASTM-D910)			Current Fuel Grades (ASTM-D910)			Foreign Fuel Grades		
Grade	**Color**	**Max. TEL M1/U.S. gal.**	**Grade**	**Color**	**Max. TEL M1/U.S. gal.**	**Grade**	**Color**	**Max. TEL M1/U.S. gal.**
80/87	Red	0.5	80	Red	0.5	91/96UL	None	0
91/96	Blue	2.0	*100LL	Blue	2.0	φB91/115	Green	φ
100/130	Green	**3.0	100	Green	**3.0	φ91	Yellow	φ
115/145	Purple	4.6				φB95/130	Amber	φ

* - Grade 100LL fuel in some overseas countries is colored green and designated as "100LL".

** - Commercial fuel grades 100 and 100/130 having TEL content of up to 4ml/U.S. gallons are approved for use in all engines certified for use with grade 100/130 fuel.

φ - B91/115 and B95/130 are specified by GOST1012-72. Max. TEL content is 2.5g/kg (B91/115) and 3.1g/kg (B95/130). Ukrainian 91 is specified by TU38.5901481-96. Max. TEL content is 2.5g/kg.

The importance of using the fuel specified for a specific model Textron Lycoming engine has always been stressed in Textron Lycoming service publications. However, if the specified fuel is not available, a higher grade fuel may be used, subject in some instances to the restrictions described in the footnotes to the following Table of Specified Fuels. The chart showing specified and alternate fuels that can be safely used in no instance permits use of fuels of lower grade than that which is specified. Also, it is not permissible in any instance to use automotive fuel in aircraft engines, regardless of octane or advertised features because of the corrosive effect of its chlorine content and because of vapor lock that could result due to its high vapor pressure. Any fuel used in Textron Lycoming engines must conform with Specifications ASTM-D910 or MIL-G-5572F.

NOTE

Isopropyl alcohol in amounts not to exceed 1% per volume may be added to the fuel to prevent ice formation in fuel lines and tanks. Although approved for use in Textron Lycoming engines, isopropyl alcohol should not be used in the aircraft fuel systems unless recommended by the aircraft manufacturer.

TABLE OF SPECIFIED FUELS

Engine Models	SPECIFIED FUELS		Alternate Military and Commercial Grades
	Certificated For Use With Grade	Commercial Grade Designation	
O-235-C, -E, -H; O-290-D; O-435-A,-C	80	80	91/96 UL ④B91/115 or ④91 or ① ⑤100LL or ⑤ ② ③100 or ⑤ ④ ② ③100/130
O-290-D2; O-320-A, -C, -E; IO-320-A, -E; AEIO-320-E; O-340-B; O-360-B, -D; GO-435-C2*; VO-435-A; GO-480-B, -D, -F; O-540-B; VO-540-A, -B	80/87		
O-320-B, -D; IO-320-B, -D; LIO-320-B1A; AEIO-320-D; AIO-320-A, -B, -C; O-480-A; O-360-A, -C; IO-360-B, -E, -L, -M; AEIO-360-B, -H; VO-360-A, -B; IVO-360-A; HO-360-A, -B, -C; HIO-360-B; O-435-A2; GO-435-C2*; O-540-A, -D, -E, -F, -G, -H; O-540-C, -D, -E, -N, -T; AEIO-540-D	91/96	100LL or 100	91/96UL or ④B91/115 or ④91 or ④100/130 or ④115/145
O-235-F, -G, -J, -K, -L; IO-320-C, -F; LIO-320-C1A; IO-360-A, -C, -D, -F; LIO-360-C; AEIO-360-A; AIO-360-A, -B; HIO-360-A, -C, -D, -E; LIO-360-A; VO-435-A, -G; GO-480-C, -G; IGO-480-A; IO-540-A, -B, -E, -G, -J, -K, -L, -M, -P, -R, -S, -U, -V, -W, AB, -AC, -AE; HIO-540-A; VO-540-C; IVO-540-A; IGO-540-A, -B; IO-720-A, -B, -C, -D	100/130	100LL or 100	④100/130 or ④B95/130 or ④115/145
TO-360-A, -C; TIO-360-A; TVO-435-A, -B, -C, -D, -E, -F, -G; GSO-480-A, -B; IGSO-480-A,; TIO-540-A, -C, -D, -E, -F, -G, -H, -J, -N, -R, -S, -U, -V, -W, -AA, -AB, -AE, -AF, -AG, -AH, -AJ, -AK; LTIO-540-F, -J, -N, -R, -U, -V; TIVO-540-A; IGSO-540-A, -B; TIO-541-A, -E; TIGO-541-B, -C, -D, -E	100/130	100LL or 100	④100/130 or ④115/145
O-320-H; O-360-E; LO-360-E; O-540-J, -L	100LL or 100	100LL or 100	④100/130 or ④115/145

* - GO-435-C2 engines with Marvel-Schebler carburetor No. 10-3991 are certificated to use 91/96 fuel.

① - Grade 100LL or 100L in which the lead content is limited to 2 ml. of TEL per gallon are approved for continuous use in all Textron Lycoming engines listed herein. Inspection procedures described in the following footnotes are not required for engines using this fuel.

② - O-235-C, O-290-D, -D2 and O-435-A2, -K1 (O-435-4) engines are built with solid stem exhaust valves. The use of fuels with higher lead content of more than 2 ml. of TEL per U.S. gallon must be limited to 25% of the operating time. If used for longer periods of time the same 150 hour inspection requirement, described in the following note is applicable. O-235-C and O-290-D models can be converted to use sodium cooled exhaust valves. See latest revision of Service Instruction No. 1246 for procedure.

③ - Early production O-320-A, -C, -D; GO-435; VO-435-A and GO-480-B, -D, -F were built with solid stem exhaust valves and their use with fuels having lead content of more than 2 ml. of TEL per U.S. gallon is limited to 25% or operating time. If specified fuel is not available and usage with high leaded fuel exceeds 25% of the operating time, the valve stems should be inspected at 150 hour intervals for erosion or "necking". This inspection is accomplished by removing the exhaust manifold and visually inspecting the valves through exhaust ports. To determine if an engine has solid stem exhaust valves, remove the rocker cover and look for valve rotor caps which are used with sodium cooled valves but not with solid stem valves in these particular engines.

④ - Continuous use of high lead fuels can result in increased lead deposits both in combustion chambers and spark plugs causing engine roughness and scored cylinder walls. It is recommended that the use of this fuel be limited wherever possible; however, when high lead fuel is used, periodic inspections of combustion chambers, valves and valve ports should be conducted more frequently and spark plugs rotated or cleaned whenever lead fouling is experienced. See latest revision of Service Letter No. L192.

⑤ - See latest revision of Service Letter No. L185 for operating recommendations.

NOTE: Revision "M" adds new engine models and B91/115 and B95/130 fuels.