

TL-Ultralight, s.r.o. Notice of Continued Airworthiness
Service Bulletin 120115
Operation with Gasoline Fuel containing Alcohol Additives

1.1 ISSUED BY: TL-Ultralight s.r.o.
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DATE OF NOTICE: 1 December 2015
EFFECTIVE DATE: Immediately
AFFECTED AIRCRAFT: TL-2000: StingSport, Sting S3, & Sting S4 and TL-3000: Sirius
AFFECTED SERIAL NUMBERS: All
NOTICE ID: SB12015
PAGES: This is page 1 of 4 pages.

1.2 SUBJECT: Operation with Gasoline Fuel containing Alcohol Additives.

1.3 TYPE OF MAINTENANCE: Fuel specifications, operator procedure changes.

1.4 QUALIFICATIONS: Owner and/or Pilot responsibilities.

1.5 REFERENCES: TL-2000/3000 Aircraft Parts Manual (APM)
TL-2000/3000 Aircraft Maintenance Manual (AMM),
TL-2000/3000 Aircraft Operation Instructions (AOI),
TL-2000/3000 Pilot Operating Handbook (POH)
FAA Special Airworthiness Information Bulletin CE-07-06

1.6 DISTRIBUTION: This Service Bulletin is sent to all registered TL-2000 & TL-3000 owners on record and it will be posted on the website of the US distributor:
www.sting.aero/owner/notices

1.7 DISCUSSION: This Service Bulletin establishes procedures regarding problems with the use of auto fuel with alcohol additives. Additional information may be available for download at www.rotax-owner.com.

- .1 Fuels have to conform to a specification in order to rely on a standard of performance. The American Society for Testing and Materials (ASTM) developed specifications for aviation gasoline as well as automobile gasoline. These specifications are ASTM D910 (latest revision) or ASTM D6227 (latest revision) for aviation gasoline, 100LL AVgas, and ASTM D439 or ASTM D4814 (latest revision) for automobile gasoline, auto fuel.
- .2 The Environmental Protection Agency (EPA) regulations require the addition of oxygenates in some regions of the country, as do some local regulations. The most widely used oxygenates are alcohol (ethanol or methanol), Methyl Tertiary Butyl Ether (MTBE), and Ethyl Tertiary Butyl Ether (ETBE).

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- .3 The Energy Policy Act of 2005 replaces the 2 percent oxygen standard with the Renewable Fuels Standard (RFS), which requires an ever-increasing amount of ethanol and biodiesel.
- .4 Reports from the field indicate that extended storage of fuel in tanks that contained E10 auto fuel, the ethanol may come out of suspension, settle in the bottom of the tank and attack the tank surfaces. This may cause seepage through the tank coating and the tank wall. These reports are located in the USA where ethanol is used as a fuel additive. The use of aviation fuel, AVgas, has not been an issue.
- .5 In approximately 100 TL aircraft, reports have totaled 3 aircraft with fuel leaks. Two required extensive fuel tank recoating to prevent further deterioration.
- .6 Other TL aircraft have reported small particles in the auto fuel from an unknown source. It is believed that these particles may be minute pieces of fiberglass which are being 'washed' out of suspension (from the 'flox-mastic' used in tank construction) by the ethanol additives.
- .7 The interior surfaces of TL fuel tanks are resistant to low levels (10% or less) of ethanol fully dissolved in gasoline but have not been tested for direct and extended contact with ethanol or other fuel additives.
 - a. Fuel additives may vary around the US but can contain unknown levels of acetone, toluene, MEK, MTBE, and other oxygenates that have an unknown effect on the fuel tank coating. The tank and sealants were not designed to withstand unknown chemical contaminants. It is impossible to determine what additives are mixed with auto fuel.
 - b. While there have been no reports of accidents due this subject it would be easy to assume that these additives may react with each other and at the same time attack the tank surfaces causing small particles or larger pieces to block the fuel filter or enter the engine fuel supply.
 - c. If the ethanol remains blended with the auto fuel the concentrations do not seem to present an issue. However, aircraft, particularly low usage aircraft, remain motionless and the fuel mixture tends to separate by specific gravities allowing high concentrations of additive in direct contact with the tank surfaces.
 - d. TL aircraft fuel tanks are made with vinylester composite resins which have an excellent resistance to chemical products. However, direct contact of the alcohol component in gasoline slowly attacks the best of composites and may penetrate the tank resulting seepage or debris in the fuel system.
 - e. A number of other aircraft manufacturers are advising operators to use Avgas and not fuel with alcohol additives (E10). For Rotax engines, using AVgas results in additional maintenance due to the lead content and higher fuel cost for the owner.

This bulletin has ASTM Designation: F 2295 / Standard Practice for Light Sport Airplane Continued Operational Safety Monitoring
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.8 General Information on E10 Gasoline

1. *Straight petroleum-based gasoline with no alcohol is referred to as E0. The 10:90 mixture of alcohol and gasoline is known as E10. A different blend of 85:15 mixture of alcohol and gasoline is referred to as E85.*
2. *Gasoline with no ethanol (E0) will greatly reduce the amount of moisture the gasoline will absorb from the atmosphere. Many areas of the country have ethanol-free gasoline available; one can do an internet search for "ethanol free gasoline" for locations.*
3. *The most common alcohol additive, Ethanol (C₂H₅OH), was originally mandated by the EPA as a replacement for MTBE (methyl tertiary butyl ether), an oxygen-bearing petroleum-sourced chemical that was added to gasoline to reduce carbon monoxide emissions. The oxygen in the MTBE (and ethanol) molecules can substantially reduce CO emissions in vehicles without closed-loop fuel-injection systems.*
4. *During periods of extended storage, ethanol tends to draw in atmospheric moisture which can lead to a build-up of water in your fuel tank. Because the density of water is greater than gasoline, an ethanol/water mixture separates from the gasoline and settles to the bottom of the fuel tank. Industry refers to this as 'Phase Separation'. Since the fuel pick-up is located on the bottom of the tank, the first product delivered to your engine may be an ethanol/water mixture.*
5. *Most of the current ethanol fuel supply is delivered from the producing states via standard rail tank cars, because it is too caustic to transmit by pipeline. It is then stored at fuel terminals and added to gasoline when tank trucks are filled for delivery to fueling stations.*
6. *The energy content of ethanol is about 33% less than pure gasoline (E0). Fuel economy may decrease as much as 4% when using E10.*
7. *Water enters the fuel in a number of methods. It's possible that water entered the gas station tank or in your 'jerrycan', but most water infiltration is from condensation. As the temperature in a tank changes, overnight or in a climb to altitude, air is vented in and out of the tank which carries moisture.*
8. *When the water in the fuel gets above its saturation point, all of the water and alcohol settle into the bottom of the tank. After this phase separation the various components of the fuel are no longer a homogeneous mixture.*
9. *Phase separation does not occur only from an increase of water. The temperature of the fuel is a factor as well. If you fill up the tank with E10 fuel that is near its water-saturation point at 60 degrees and the temperature drops 20 degrees, then all the water and alcohol settle out even though no extra water has been added. The gasoline remaining above the water has probably lost 3 or 4 octane points. It's also missing a bunch of additives that stayed in the alcohol.*
10. *The alcohol and ethanol/water oxidizes in the tank and may produce a tenacious brown mix that's more damaging to fuel systems than the typical varnish produced by E0 gasoline. In warmer weather, varnish will start to form within a month of dispensing even fresh E0 fuel into a tank or storage can.*
11. *Ethanol volume found at gas pumps changes daily with each gasoline delivery.*
12. *Octane boosters, stabilizers and fuel system cleansers contain alcohol.*
13. *No product will prevent all water absorption or safely repair phase separated (PS) fuel.*
14. *Some states mandate ethanol in gasoline, some allow premium without ethanol, some do not even require pump labeling to inform consumer when alcohol is added.*

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- .9 Inexpensive portable test kits that check presence of water and alcohol in auto fuel are readily available. However, you can test for the presence of alcohol:
- Using a glass or chemical-resistant plastic (such as TPX) container, mark ten equally spaced volume marks. (A graduated cylinder is ideal; however, a non-tapered glass jar, such as a large olive bottle, will work.)
 - Add one-part water into the container, fill to the first mark,
 - Then add nine parts of gasoline, (fill to the top mark). Shake thoroughly, let stand for 10 minutes or until gasoline is again clear.
 - Record the apparent level of the line between the gasoline and water. If alcohol is present in the gasoline, the water will absorb it, and the amount of water will appear to increase.
If the water level remains the same as was added, no alcohol is present in the gasoline.

1.8 WEIGHT AND BALANCE: No change

1.9 CORRECTIVE ACTION: All TL aircraft should be operated as follows:

- Any E10 gasoline remaining in the aircraft fuel system should be drained and replaced with E0 (ASTM D439 or D4814) or 100LL AVgas (ASTM D910).
- After servicing with the above fuel, the engine should be operated for a sufficient period of time to ensure normal operating temperatures are achieved.
- Do not store the aircraft for more than 2 weeks without complying with steps 1 and 2 above. (The amount of existing E10 fuel to drain does not change the procedure. A smaller amount of ethanol fuel creates the same issue as a full tank. Due to the inactivity, each additive with a different specific gravity of will separate from suspension and result in direct contact with the tank surface.)
- Operate all aircraft with minimum 91 octane auto fuel (E0) without alcohol additives or 100LL AVgas or a mixture of auto fuel (E0) without alcohol and 100LL AVgas in any proportion.
- Store wing tanks empty until the flight which requires the additional fuel.

2.0 COMPLIANCE: The aircraft AOI / POH procedures will be changed to reflect this Service Bulletin. This Service Bulletin is not cause for grounding. An aircraft with a valid annual condition inspection is considered to be in a condition for safe operation. Flight for re-positioning to complete services required in this Service Bulletin is acceptable. Enter compliance with this Service Bulletin in the aircraft log as required.

END SB12015

This bulletin in accordance with ASTM Designation: F 2295 / Standard Practice for Light Sport Airplane Continued Operational Safety Monitoring
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