



# County of San Diego

DEPARTMENT OF ENVIRONMENTAL HEALTH  
HAZARDOUS MATERIALS DIVISION  
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## GENERAL AVIATION MANAGING SUMPED AVIATION GAS (AVGAS)

*County of San Diego Pollution Prevention*

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### **Summary:**

- Small amounts of AvGas fuel are “sumped” (sampled) during pre-flight safety inspections
- If safe to do so, clean AvGas may be returned to the aircraft fuel tank
- AvGas may be recycled by filtering with devices such as the GATS jar
- AvGas may be repurposed for use in certain motorized ground equipment
- If not recycled, waste AvGas must be disposed of lawfully as a hazardous waste
- Any water sumped from a fuel tank must be disposed of lawfully as a hazardous waste
- If you sump AvGas you must have a legal means of hazardous waste disposal readily available



**California law prohibits disposing of aviation gasoline (AvGas) to the ground, sewer, or storm drain. Violators are subject to fines up to \$25,000 per incident. Refer to the California Health and Safety Code [HSC §25100] for more details.**

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### **INTRODUCTION**

According to Federal Aviation Administration (FAA) data, there were approximately 140,000 active piston-powered General Aviation (GA) aircraft in the United States with over 12.9 million hours flown in 2014. Each of those aircraft rely on aviation gas (AvGas) to fuel their engines. AvGas is a highly flammable liquid containing organic lead and is a hazardous material. During the mandatory pre-flight safety inspection, pilots sample the fuel in the aircraft and inspect the fuel for contaminants. Samples that cannot be returned to the aircraft’s fuel tank must be managed as hazardous waste; however AvGas is commonly disposed of to the ground and pavement because no convenient waste disposal option exists at many airfields. This unnecessary “sump and dump” practice is illegal under several California and federal environmental laws, can deteriorate asphalt aprons leading to aircraft damage, causes harm to the environment, and puts public health at risk. Best management practices for aircraft operators and legal disposal options for waste AvGas are provided in this document.

## **WHY IS AVGAS HAZARDOUS?**

Aviation gas (AvGas) is hazardous because it exhibits hazardous properties as defined by federal and state laws including flammability and toxicity. It is an extremely flammable liquid with a flashpoint of -40 °F (-40 °C) which is well below the hazardous classification flashpoint threshold of 100°F (37.8°C). AvGas is a mutagen and carcinogen, and has acute and chronic effects for both human health and the environment in soil and water. The most commonly used 100-LL AvGas contains up to 0.56 g/L of organic lead which is a toxic metal regulated pursuant to Title 22 by the California Code of Regulations (CCR) as a hazardous waste with persistent and bioaccumulative toxicity [22 CCR §66261.113].

Organic lead can be inhaled and absorbed in the bloodstream with toxic effects, especially in children, the elderly, and sensitive individuals. Lead is a pollutant regulated by many laws administered by the U.S. Environmental Protection Agency (EPA) including the Toxic Substances Control Act (TSCA), the Clean Air Act (CAA), the Clean Water Act (CWA), the Safe Drinking Water Act (SDWA), the Resource Conservation and Recovery Act (RCRA), and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), among others.

Leaded gasoline for use in automobiles was banned by the EPA in 1990 and completely eliminated from the market by 1995. AvGas is the only leaded fuel currently remaining on the domestic market. Piston-powered aircraft rely on the tetraethyl lead (TEL) additive in AvGas to protect the engine against damaging detonation called “knock” which can cause sudden engine failure. The U.S EPA and the FAA are working together to find a replacement for 100LL AvGas.

In addition to organic lead, AvGas also contains more than 115 chemicals. Some constituents are volatile organic compounds (VOCs) that rapidly volatilize to the atmosphere, while others are heavier constituents that can persist in soil and water. AvGas reacts chemically with asphalt causing it to soften and deteriorate. This results in permeable areas which allow the penetration of petroleum hydrocarbons to the underlying soil and groundwater, and increases the risk of foreign object damage (FOD) to aircraft.

## **WHAT IS SUMPING?**

Pilots are required to conduct a pre-flight inspection to determine airworthiness prior to operating an aircraft [14CFR§91.7(b)]. During this inspection, the fuel in the aircraft is visually examined to ensure it is the proper type and not contaminated with water or particulates. Contamination in AvGas can cause catastrophic engine failure during flight if undetected. In piston-powered aircraft a small amount of fuel is drawn from several quick drain valves located under the forward section of the fuselage and beneath both wings. This practice of draining fuel to check for contamination is referred to as “sumping” in the General Aviation (GA) community.

Given enough time, water and some heavier particulates will sink in AvGas and collect at low points in the fuel system. Water contamination in the fuel appears as a visible phase separation in the fuel sample. Drains are strategically located at low points in the aircraft fuel tanks and at the fuel strainer, (also known as a “Gascolator”).

The total amount of fuel drained during the pre-flight inspection varies. The number of fuel drains differs between aircraft makes and models; for example, older Cessna 172 models have only three drains whereas newer ones have thirteen drains. The volume of a single sample can range from less than two to ten ounces depending on the size of the sample jar. Further, multiple samples may be taken from a single drain if contamination is observed. In the case of water in the fuel, some pilots may continue to draw fuel until no further water contamination is observed.

In addition to the pre-flight safety check on aircraft, AvGas is also tested by the operators of fuel trucks that deliver AvGas to aircraft. Fuel truck operators routinely remove approximately two to three gallons of fuel from a tank drain which draws from a sump located at the bottom of the bulk tank. The fuel is inspected for contaminants and then poured through a filter into a separate holding tank mounted on the truck. Uncontaminated fuel is commonly returned to the bulk fuel storage tank managed by the Fixed Base Operator (FBO) where it undergoes additional filtering or polishing and is put back into distribution. Most FBOs operate under a hazardous materials permit with the local Certified Unified Program Agency (CUPA) and maintain a hazardous waste container or storage tank for disposal of contaminated fuel by a State registered hazardous waste transporter.

### **WHAT IS SUMPING AND DUMPING?**

Unlike permitted FBOs with hazardous waste containers, smaller operators often do not have a convenient method to dispose of waste fuel. If a sample taken during the pre-flight safety inspection cannot be returned to the aircraft fuel tank, a common practice is to dispose of the sumped fuel to the ground. This practice is known as “sumping and dumping” and is illegal, regardless of the amount of fuel disposed of on the ground. California law prohibits the improper disposal of AvGas [HSC §25100 etc.] and violators are subject to fines reaching \$25,000 per incident.

### **WHAT ABOUT VERY SMALL AMOUNTS OF WASTE FUEL?**

Improper disposal of any amount of hazardous waste is illegal!

Any amount of waste AvGas or water sumped from an aircraft fuel tank must be recycled or managed as hazardous waste. The California Health and Safety Code requires that hazardous waste generators use best management practices for the safe handling, treatment, recycling, and disposal of hazardous waste regardless of the amount [HSC §25100].

### **WHEN DOES AVGAS BECOME A HAZARDOUS WASTE?**

AvGas becomes a hazardous waste the moment it is intended for disposal. This may occur if a pilot observes the fuel in the aircraft is the wrong grade, is contaminated by water or particulates, or is otherwise unsafe to use. For some operators, Standard Operating Procedures (SOPs) may forbid sumped fuel to be returned to the aircraft fuel tank for safety reasons. Aircraft mechanics at these facilities maintain that fuel drawn from sumps designed to collect sediments is more likely to contain contaminants that pose a risk to flight safety and furthermore, and that not all contamination in fuel is readily detected visually.

## **CAN AVGAS BE RECYCLED?**

Recycling means using, reusing, or reclaiming hazardous waste [HSC §25121.1(a)] and is the preferred method over hazardous waste disposal. Examples of recycling include filtering, polishing, and repurposing.

## **CAN I USE A GATS JAR?**

If possible, filtering AvGas fuel so it may be used in the aircraft is an acceptable practice. Pilots may use an effective sampling device with a filter to remove contaminants so the sumped fuel may be returned to the aircraft through the fill port. A GATS jar was developed by Embry-Riddle Aeronautical University for this purpose. Several other types and brands of filtering samplers are also available on the retail market. Filtering samplers have a physical screen that separates AvGas from contaminants at a molecular level.

## **CAN I POLISH AVGAS?**

FBOs clean AvGas fuel routinely by filtering and polishing it before returning it to a bulk storage tank. Contaminants such as particulates and water separated from the fuel during the filtering cannot be disposed of to the ground, sewer, or storm drain. The water is likely hazardous waste and must be collected and disposed of lawfully.

## **CAN I USE WASTE AVGAS IN MY TOW?**

AvGas unsuitable for use in an aircraft may be used in some ground-based equipment that can safely operate on leaded fuel, such as certain motorized aircraft tows, chainsaws, lawnmowers, or weed trimmers. Check with the equipment manufacturer and also your local air pollution regulatory agency regarding restrictions on the use of leaded fuel in small engines. The County of San Diego Air Pollution Control District (APCD) allows leaded fuel to be used in small non-vehicular engines with less than 25 horsepower per the California Code of Regulations (13 CCR §2775; subject to regulatory change).

## **HOW CAN I DISPOSE OF WASTE AVGAS?**

Significantly contaminated AvGas that cannot be recycled and contaminated water sumped from an aircraft's fuel system must be stored and disposed of as hazardous waste by a California registered hazardous waste transporter. It is illegal to dispose of AvGas or contaminated water to the ground, sewer, storm drain, or evaporate to air. Every aviation operator will generate waste fuel or contaminated water at some point in time and therefore must have a plan and means to dispose of it properly. If you routinely generate AvGas waste at your facility, you may be subject to a hazardous waste generator permit in California from the local regulatory agency. Hazardous waste generators must also maintain an active EPA Identification Number. For more information on obtaining an EPA number for your facility, visit the DTSC website at: <http://www.dtsc.ca.gov/IDManifest/index.cfm>

Hazardous waste disposal and transportation costs can be expensive for private aircraft operators. A private operator that generates small amounts of waste AvGas may add their waste fuel under mutual agreement with an onsite aviation facility to an existing waste fuel container that is properly labeled, stored, and disposed of. Certain conditions may apply including notification, restrictions on amounts,

and location at the same airfield. Contact your local environmental health department for more information.

## **WHAT TYPE OF HAZARDOUS WASTE CONTAINER SHOULD BE USED?**

It is strongly recommended that waste fuel containers be National Fire Protection Agency (NFPA) NFPA-30 certified for storing flammable liquids under Occupational Safety and Health Administration (OSHA) regulations [29 CFR §1910.106 and §1926.152]. These are approved containers five gallons or less in size having a spring-closing lid and spout cover; designed so it will relieve internal pressure when subject to fire exposure. Hazardous waste containers must be inspected at least weekly for good condition, be properly labeled, and securely closed except when waste is being added or removed. In addition, hazardous waste containers located on the airport apron or other outdoor areas must have secondary containment to comply with storm water quality regulations under Federal, State, and County General Permits for storm water pollution prevention.

## **SUMMARY**

Always sump your fuel as a part of your pre-flight safety inspection in accordance with the operating handbook for your aircraft and FAA regulations. By using filtering fuel samplers, recycling sumped AvGas, and managing waste AvGas properly as hazardous waste you are protecting the environment, protecting the apron surface from deterioration, reducing FOD damage to aircraft, and saving money in fuel costs.

If your airfield does not already have a convenient fuel waste collection program in place, consider approaching airport management and tenant operators about implementing one. For more information about how to implement and maintain a waste AvGas management program contact:

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County of San Diego Dept. of Public Works, Watershed Protection Program  
County of San Diego Hazardous Materials Division  
San Diego Regional Water Quality Control Board*