REFUEL YOUR EXPERIENCE

WARTER aviation

WARTER AVIATION SUPERIOR QUALITY

AVGAS WA UL91

AVGAS 100LL

JET - A1

SMOKE OIL

DEICING PRODUCTS

WWW.WARTERAVIATION.COM

ABOUT US

WARTER aviation. History, passion, confidence.

WARTER aviation is a brand owned by the Warter Fuels S.A. Group. It is a leading manufacturer and distributor of aviation fuels in the world. Warter Fuels S.A. was founded as a result of merger of a long-term cooperation of OBR from Płock, its experience in manufacturing of petroleum products with modern lab and process facilities, ongoing monitoring of the aviation sector needs on a global scale and practical knowledge of leading experts.

Your needs are important for us.
WARTER aviation product range includes:

- AVGAS aviation fuels – unleaded AVGAS WA UL91, leaded AVGAS 100LL,
- Turbo-combustion engine aviation fuel – JET-A1,
- Smoke Oil,
- Deicing & anti-icing products for planes and airport surfaces.

Quality is our reality and commitment.
The key value of our products is superior quality which we ensure at each production, storage and delivery stage.

Safety.
Compromise is never our way. Safety of our customers is our superior value!

From pilots for pilots.
Our brand is appreciated both by individual customers as well as airport operators from around the world. Our offer is intended for general-purpose, commercial and military aviation.

We deliver globally!
We deliver to any place in the world you choose.

Wherever you are – we are there for you.
We always wish to be one step Ahead of your needs. And you are one step Ahead of your competitors just using our products. Check out our offer and find out the benefits of cooperation with WARTER Aviation.

WHY AVGAS WA UL91?
UNLEADED, ETHANOL-FREE, ENVIRONMENT-FRIENDLY.

- Aviation fuel which will ensure your safety!
- Designed solely for aviation purposes (in contrast with MOGAS).
- Safe for the pilot, safe for the environment.
- Clean – all components are subject to careful verification and examination during the manufacturing process.
- Dedicated for aircraft piston engines.
- Ideal for ultra-light planes.
- Broad application among such engine manufacturers as Rotax, Lycoming and many others.
- LAA-999-413 certificate of conformity. Supplement 5 specifies the application of WA UL91 in the UK. Lycoming SI 1070Y, accepted by FAA, specifies types of engines approved for WA UL91.
- Manufactured as per ASTM D 7547 and DEF STAN 91-90.

WHY NOT MOGAS?

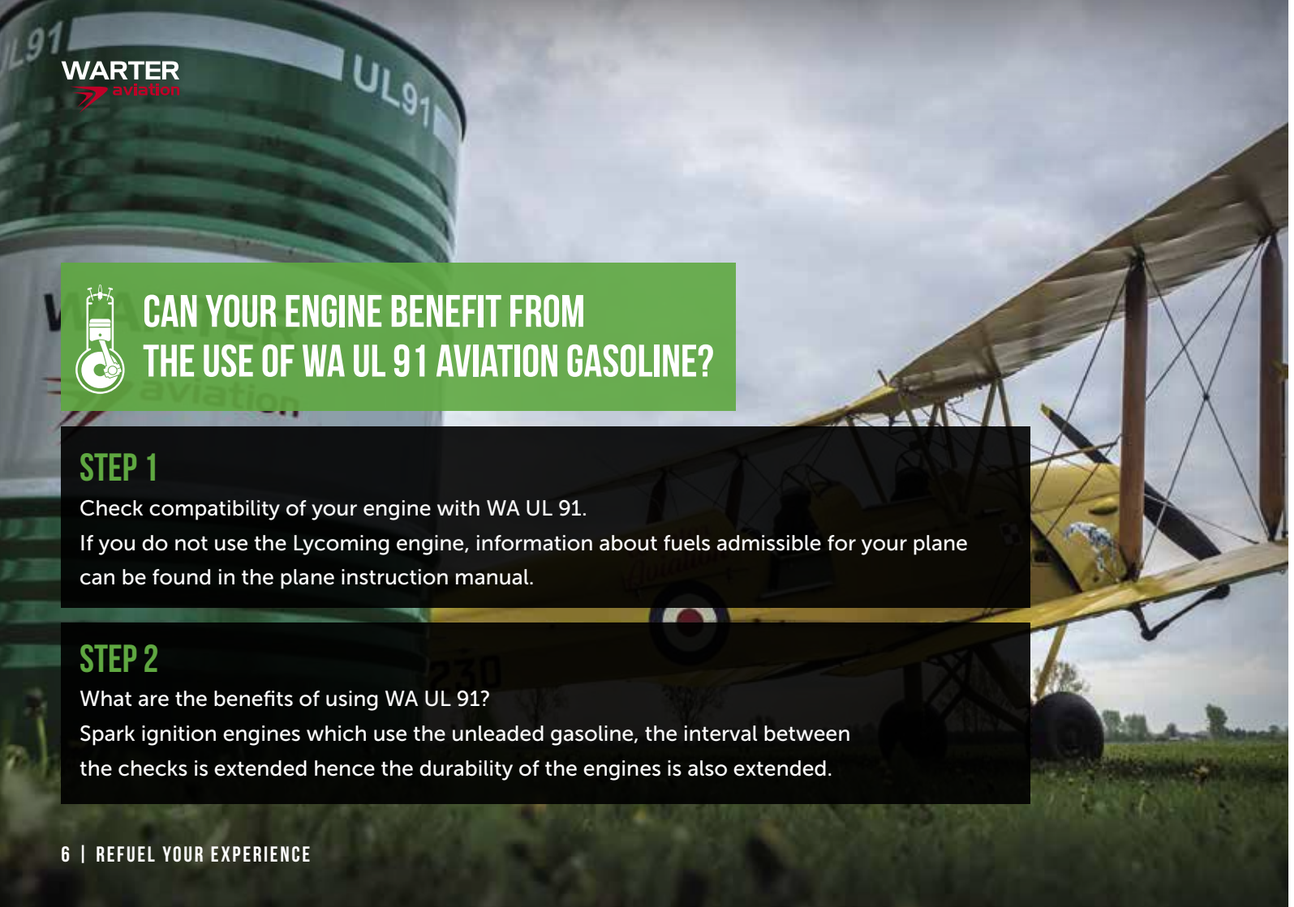
USE OF ALCOHOL – a general practice aimed at increasing the octane index is use of ethanol or ETBE compounds. Presence of alcohol in petrol may have multiple adverse effects on aircraft engines and their parts especially those made from rubber, plastic or composite. They may not only cause damage of such elements but also enable plastic and rubber components particles to penetrate the fuel system. Gasoline filtering system may be blocked or partly blocked. MOGAS users have to carry out detailed checks more often in order to avoid the fuel system failure or damage of the aircraft's engine.

VAPOUR LOCK – carburettor icing. Due to higher volatility level of MOGAS, the occurrence of "vapour lock" is more likely. Especially after the engine has been used at the maximum operating temperature. The carburettor icing occurs much sooner in comparison with WA UL91. MOGAS absorbs more heat in the process of fuel and air mixing and therefore may cool down sooner during evaporation the consequence of which is ice accumulation around the carburettor.

FUEL QUALITY – aviation fuels are subject to rigorous checks aimed at ensuring 100% purity of AVGAS. Quality standards require monitoring at all stages of preparation of the components and manufacturing process, transport, storage on customer site in dedicated tanks until the refilling the aircraft tank.
The principal downside of the MOGAS vehicle fuel is that it is not carefully checked with a view to contamination after it has left the refinery. Sometimes, during the transport and storage inadequate elements penetrate it which have an adverse effect on the engine and fuel supply system operation.

TRANSPORT – usually, MOGAS is stored in containers which are not designed for aviation sector, i.e. made form plastic. There have been many cases of electrostatic chargé being suspended during the refilling.

DO NOT TAKE YOUR CHANCES WITH MOGAS.
YOUR SAFETY IS OUR TOP PRIORITY!



CAN YOUR ENGINE BENEFIT FROM THE USE OF WA UL 91 AVIATION GASOLINE?

STEP 1

Check compatibility of your engine with WA UL 91.
If you do not use the Lycoming engine, information about fuels admissible for your plane can be found in the plane instruction manual.

STEP 2

What are the benefits of using WA UL 91?
Spark ignition engines which use the unleaded gasoline, the interval between the checks is extended hence the durability of the engines is also extended.

EXTENDED INTERVAL BETWEEN TECHNICAL CHECKS FOR SPARK IGNITION ENGINES USING THE UNLEADED GASOLINE

Technical service tasks	Working time for maintenance checks	
	Leaded gasoline	Unleaded gasoline
Engines with oil filter, after replacement and initial 50 h, complete oil replacement.	50 h*	100 h*
Filter replacement (after transitory period)	50 h	
Engines with oil pressure sensor filters, after replacements following the transitory period, complete oil replacement.	25 h*	50 h*
Oil pressure sensor filter replacement / monitoring / cleaning (after changes deriving from the transitory period)	25 h	

*or every 4 months, whichever occurs first; also: delete, check, clean and re-install the oil suction screen. Guidelines on the monitoring of oil filter and oil pressure sensors are given in Operational Bulletin no. 480.

Lycoming Operational Letter No. L 270
The letter presents benefits derived from the extended interval between and routine application for unleaded gasolines as presented in the recent edition of Operational Instruction no. SI-1070 for Lycoming engines.

AVGAS WA UL91

WA UL91 AVIATION GASOLINE

Specification
Unleaded aviation gasoline WA UL91 is in conformity with ASTM D 7547, DEF STAN 91-90.

Product
Aviation gasoline WA UL91 is a blend of hydrocarbons obtained in the process of crude oil processing. It contains antioxidant and anti-electrostatic additives.

Use
Aviation gasoline WA UL91 is used in aviation piston engines.

Durability
Aviation gasoline satisfies technical conditions in the period of 2 years of the manufacture data subject to proper storage.

Storage
The fuel should be stored in closed tanks protecting the fuel from contact with air, dampness, mechanical contamination, exposure to sun and other light sources.

Colour	Naturally colourless	
Anti-knock properties		
Motor octane number, MON	Min 91	
Research octane number, RON	Min 96	
Fractional composition		
10% of the volume	°C	Max 75
40% of the volume	°C	Min 75
50% of the volume	°C	Max 105
90% of the volume	°C	Max 135
Final distillation	°C	Max 170
Performance	% (v/v)	Min 97
Residue	% (v/v)	Max 1,5
Loss	% (v/v)	Max 1,5
Total distillation temperature 10% of the volume +50% of the volume	°C	Min 135

Sulphur content	% m/m	Max 0,05
Lead content	gPb/l	Max 0,013
Calorific value	MJ/kg	Min 43,5
Crystallising point	°C	Max (-58)
Copper corrosion 2h at t=100°C	Corrosion resistance	Max 1
Inherent resin content	mg/100ml	Max 3
Reaction with water, change of volume	ml	Max 2
Conductivity at 20°C	pS/m	50-450
Vapour pressure at 37.8°C	kPa	38-49
Oxidation stability = 100°C for 16 h		
Potential resin content	mg/100ml	Max 6

AVGAS 100LL

AVGAS 100LL

Specification

Aviation gasoline AVGAS 100LL is manufactured as per DEF STAN 91-90, 4th ed., ASTM D910 and NO-91-A235 defence standard.

Product

Aviation gasoline AVGAS 100LL is a blend of hydrocarbons obtained in the process of crude oil processing. It contains anti-knock, colouring, antioxidant and anti-electrostatic additives.

Use

Aviation gasoline AVGAS 100LL is used in aviation piston engines.

Durability

Aviation gasoline satisfies technical conditions in the period of 2 years of the manufacture data subject to proper storage.

Storage

The fuel should be stored in closed tanks protecting the fuel from contact with air, dampness, mechanical contamination, exposure to sun and other light sources.

Colour	Blue	
Anti-knock properties		
Motor octane number, MON	Min 99,6	
Performance number, PN	Min 130	
Fractional composition		
10% of the volume	°C	Max 75
40% of the volume	°C	Min 75
50% of the volume	°C	Max 105
90% of the volume	°C	Max 135
Final distillation	°C	Max 170
Performance	% (v/v)	Min 97
Residue	% (v/v)	Max 1,5
Losses	% (v/v)	Max 1,5
Total distillation temperature 10% obj. +50% obj.	°C	Min 135

Sulphur content	% m/m	Max 0,05
Lead content	gPb/l	Max 0,56
Calorific value	MJ/kg	Min 43,5
Crystallising point	°C	Max (-58)
Copper corrosion 2h w t=100°C	Corrosion resistance	Max 1
Inherent resin content	mg/100ml	Max 3
Reaction with water, change of volume	ml	Max±2
Conductivity at 20°C	pS/m	50-450
Vapour pressure at 37,8°C	kPa	38-49
Oxidation stability = 100°C for 16 h		
Potential resin content	mg/100ml	Max 6
Solid content	mg/100ml	Max 2

JET A-1

Specification
Aviation fuel JET -A1 is manufactured as per AFQRJOS, DEF STAN 91-091, ASTM D 1655-16a.

Product
Aviation fuel for turbine engines is a refined bridge fraction which is blend of hydrocarbons, obtained from conservative and secondary crude oil processing. It contains antioxidant and anti-electrostatic additives.

Use
Aviation gasoline JET-A1 is used in aviation turbine engines.

Storage
The fuel should be stored in closed tanks protecting the fuel from contact with air, dampness, etc.

SMOKE OIL

Product

Smoke Oil is a professional, crystal clear mineral oil. It produces intensive white fumes trails with a long trail exposition.

- Safe for the pilot and the audience.
- Environment-friendly – non-toxic, biodegradable.
- The purest fraction of the mix of Vaseline and paraffin oil.

Use

Aviation smoke oil is intended for smoke generators in planes with piston engines.

Available tanks

- Plastic canisters – 20l
- Steel barrels – 200l

Size	Unit	Method	Value
Kinematic viscosity 40 °C	mm 2/s	ISO 3104	99,9
Appearance	-	visual	Clear and light
Colour (Saylbolt)	-	ASTM D 156	30
Density at 15 °C	kg/m^3	ISO 12185	808,5
Refractive index 20 °C	-	DIN 51423-2	1,45
Purity requirements for white medical oils	-	EU PHARM	Satisfied
Pour point	°C	ASTM D 5950	-39
Ignition temperature	°C	ISO 2719	192

DEICING PRODUCTS

DEICING & ANTI-ICING PRODUCTS

Modern, chemical, dicing agents also preventing aircraft icing and airport surfaces.
They remove snow, frost, ice and protect against re-icing.

WARTER BORYGO RUNWAY KF

Airport Surface de-icing agent

Airport surface de-icing agent based on potassium formate. The fluid contains a package of corrosion inhibitors protecting elements from metal and metal alloys used in aviation industry. The content of the active substance is at least 50%. The product is conformant with AMS 1435C.

Characteristics
Appearance: colourless, clear, homogeneous fluid of one colour, without separating layers, particles or foreign objects
Density: 1.34-1.35 g/cm3
pH (at 20 °C): 10.7 (±0.5)
Crystallising point:
Solution 50% (weight) -15 °C
Ready for use -60 °C

Container size:
1000l – palletised containers/bulk

WARTER BORYGO RUNWAY SF

Airport Surface de-icing agent

Granulate used for airport surfaces de-icing based on sodium formate. The granulate contains a package of corrosion inhibitors protecting elements from metal and metal alloys used in aviation industry. The content of the active substance is at least 98%.
The product is conformant with 1431D.

Characteristics
Appearance: white, homogeneous, irregular, without lumps, free form foreign objects
Density: 1.34-1.35 g/cm3
pH (at 20 °C): 9.5 (±0,5)
[particle size: > 2mm < 8mm
Crystallising point:
Solution 15% (weight) -9 °C (effective up to -18 °C)

Package size:
25kg, 500kg or 1000kg - big bag

WARTER PLANE GA

De-icing agent preventing aircraft Surface icing

Warter Plane GA is used to prevent or remove ice from planes with the protection system type TKS which may also be used for de-icing on the ground. The product is conformant with DTD 406 B.

Characteristics
Appearance: transparent, colourless fluid
pH: 6.0 - 7.5
Ignition temperature: > 60 °C
Freezing temperature:
does not freeze at -40 °C for 1 h

Packaging size:
10l, 20l, 200l - containers

OUR LOGISTICS

TANK TRUCKS

CAPACITY UP TO 36 000 L

Depending on customer requirements, tanks are provided with a pump and counter or prepared for gravitational unloading. Separation of the tanks space carrying different products and / or serving different customers at the same time. Capacity from 34 000 l to 36 000 l, provided with a pump, counter (at 15 °C) and unloading report printer.

ISO-TANKS

ROAD, RAILWAY AND MARITIME TRANSPORT

ISO-tanks capacity ranges from 22 000 to 35 000 l.

Tank / container ISO 20'

Capacity: 17 000 kg, equivalent of 23 700 l at 15°C. Ideal for maritime transport.

Tank / container SWAP BODY 23' – 26'

Ideal for mixed transport in Europe. Capacity: 24 000 kg, equivalent of 33 400 l at 15°C

STEEL BARRELS

STORAGE

CONTENT:

195 l, loading: 145kg AvGasu

55 l, loading: 40kg AvGasu

NOTES

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WE SHIP TO THE WHOLE WORLD!