	OBR J.S.C.	TECHNICAL SPECIFICATION	WT-09/OBR PR/PD/48
	IN	Aviation Fuel AVGAS 100LL	ed. VI

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**I am approving for applying
From 20.08.2014**

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1. The scope of TS

The scope of TS is aviation fuel, which is the mixture of hydrocarbon compounds, derived from conservative and secondary processes of the crude petroleum and suitable amounts of antiknock, dyeing, antioxidant and antistatic additives.

Requirements concerning the scope of TS were formulated in accordance with the requirements of the standard DEF STAN 91-90 ed. 3 and ASTM D910.

2. The application of TS

The aviation fuel is applied to power aircrafts with piston engines.

The product meets the requirements of standard DEF STAN 91-90 ed. 3 and ASTM D910.

3. The division and designation

The division – does not apply

Designation – Aviation fuel AVGAS 100LL.

4. Requirements and research

4.1 General requirements

The Producer is obliged to add to the aviation fuel dyeing and antiknock additives. There may be used also other additives specified in this TS. The Producer is obliged to publish the name and quantity of the added additives in quality certificate issued by him. The aviation fuel shall be produced in accordance with the explicitly settled technology.

4.1.1. Antiknock additives

Tetraethyl lead shall be present and added in the form of an antiknock mixture containing not less than 61% (m/m) of tetraethyl lead and the same amount of ethylene dibromide to provide two atoms of bromine per atom of lead. As the antiknock additive there is used the ethyl liquid TEL-B from Innospec / Alcor company.


The total quantity of the additive shall be matched so that the lead content in the fuel shall not exceed 0,56 g Pb/l of the fuel.

4.1.2. Dyeing additives

The aviation fuel shall contain the identifying additive dyeing into blue 1,4 dialkylaminoanthraquinone in quantity not exceeding 2,7 mg /L.

4.1.3. Antioxidant additives

Antioxidant additives prevent from formulating gums and other oxidizing products, as well as knocking out the lead compounds. The content of the additives expressed in mass of the active element shall not exceed 12,0 mg/L of the fuel.

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There is used BHT as the oxidizing additive (2,6 – ditertiary butyl-4-methylphenol).

4.1.4. Antistatic additives

Antistatic additives are used for fuel in the quantity which assures obtaining conductivity according to the requirements in the table of detailed requirements, i. e. in the range of $50 \div 40$ pS/m. There is applicable STADIS 450 as the antistatic additive, the concentration of the additive in fuel shall not exceed 3,0 mg/liter.

4.1.5 Stability

The aviation fuel meets the requirements of TS within two years from the date of production on condition of proper storing.

4.1.6. Packaging, storage and transport

The aviation fuel AVGAS 100LL is supplied in specific tank trucks, isotanks and steel drums allowed to transport aviation fuel.

The package in which the fuel will be transported must be checked if it is clean, dry and unharmed.

In case of tanks, on each packaging unit, in shipping documents shall be placed permanently designation including:

- The name of the fuel
- The quantity of the fuel in package
- The date of production and the number of charge
- Warning of fire hazard and Health and Safety at work
- The code of supply contract, if required

The fuel shall be stored in packages protecting the fuel from the access of air, humidity and mechanical contamination. In places protected from direct influence of sunbeams, heating (the underground containers with limited air exchange). This restriction is made to limit both the losses associated with evaporation and losses of the lightest components, what will cause the change of two key parameters of the fuel: Reid vapour pressure and fractional composition.


On the tanks there shall be placed the informational table with identification number of hazards according to ADR and identification number of material UN.

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1203

In accordance with the contract ADR 2013-2015, the provisions from part IV of ADR regarding allowed level of filling and properties of aviation fuel produced by OBR J.S.C. it is hereby established that the allowed level of filling steel drums is up to 92,5% of nominal volume. Simultaneously, the allowed level of filling is established for the normal conditions in the temperature from -20°C to $+55^{\circ}\text{C}$.

4.2 Detailed requirements

4.2.1. Research

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For each portion of aviation fuel (after finishing the composing) shall be made following analyses in accordance with the table of detailed requirements:

- Appearance,
- Colour,
- Fractional composition,
- Density at 15 °C,
- Reid vapour pressure at 37,8 °C,
- Freezing point,
- Electrical conductivity at 20 °C,
- Motor Octane Number,
- Existent Gum,
- Oxidation Stability at 100°C, through 16 hours,
- Total Sulphur,
- Lead content,
- Specific energy,
- Corrosion copper strip,
- Water Reaction.

The determination Performance Number shall be done quarterly.

Standards and requirements for above determinants are specified in the table of detailed requirements.

In case of military acceptance the research is determined in separate documents (among others: the agreement, defense standard etc.), in agreement with Client.

4.2.2. Visual examination of Appearance


The product shall be poured into glass barrel made of colourless glass with diameter from 40 mm to 50 mm, and next shall be visually examined in the light traversing through appearance of product.

The research shall be made at 20 ±5°C. The fuel meets the requirements if while the research the fuel is colourless liquid free from solid matter, turbidity and water.

4.2.3. Sampling


The sample shall be taken from connection pipe of circulating pump after finishing the mixing (the mixing time: min. 4 hours) in quantity around 5 liters for total extent of TS, to the bottles made from amber glass. In three bottles shall be left around 50 cm³ of air because of liquid expandability.

Two of the bottles shall be filled up to 0,8 dm³ (assigned for pressure analysis).

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4.2.4. Table of detailed requirements for aviation fuel Avgas 100LL

Test	Property	Units	Limits	Method
1	Appearance	-	Clear, bright and visually free from solid matter and undissolved water at ambient temperature	Acc. to p. 4.2.2. WT-09/OBR PR/PD/48 ASTM D 4176
2	Colour	-	Blue	ASTM D 2392
3	Colour, Lovibond RYBN	-	R – Y – B 1,7 ÷ 3,5 N –	IP 17 IP 569
4	Knock Rating:	-	Min 99,6	ASTM D2700 IP236
	- Motor Octane Number MON - Performance Number *	-	Min 130	ASTM D 909 IP119
5	Distillation:	°C	Report	ASTM D 86 IP 123
	- Initial Boiling Point	°C	Max 75	
	10 vol %	°C	Min 75	
	40 vol %	°C	Max 105	
	50 vol %	°C	Max 135	
	90 vol %	°C	Max 170	
	Final Boiling Point	°C	Min 97	
	Productivity	% (v/v)	Max 1,5	
	Residue	% (v/v)	Max 1,5	
	Loss	% (v/v)	Min 135	
	Sum of 10% + 50% evaporated temperatures	°C		
6	Total sulphur	% (m/m)	Max 0,05	ASTM D 2622 ASTM D 1266 ASTM D 5453 IP 107
7	Lead Content	g Pb/I	Max 0,56	ASTM D 5059 ASTM D 3341 IP 270
8	Density at 15°C	kg/m ³	Report	ASTM D 4052 ASTM D 1298 IP 365

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9	Specific energy	MJ/kg	Min 43,5	ASTM D 4529 ASTM D 3338 IP 12
10	Freezing point	°C	Max (-58)	ASTM D 2386 ASTM D 7153 IP16
11	Corrosion copper strip, through 2 hours at 100 °C	Corrosion level	Max 1	ASTM D 130 IP154
12	Existent Gum	mg/100 ml	Max 3	ASTM D 381 IP131
13	Water Reaction -volume change	ml	Max 2	ASTM D 1094 IP289
14	Electrical conductivity at 20 °C	pS/m	50 ÷ 450	ASTM D 2624 IP274
15	Reid vapour pressure at 37,8 °C	kPa	38 ÷ 49	ASTM D 5190 ASTM D 5191 ASTM D 323 IP 69
16	Oxidation Stability at 100 °C, through 16 hours - Potential Gum - Precipitate	mg/100 ml mg/100 ml	Max 6 Max 2	ASTM D 873 IP138

- 1) The distillation is conducted the same as for products from group 2, while distillation the temperature of condenser is maintained from 0 °C to 15 °C.
- 2) The values of properties to which the requirements were specified as “report” are declared by the producer of the product.
- 3) When a Static Dissipator Additive has been added to the fuel the conductivity shall be measured at ambient temperature and in quality certificate shall be specified the temperature of measure and value of conductivity which shall be in the range 50 pS/m to 600 pS/m.
- 4) Test of performance number shall be made quarterly.*

THE END

ADDITIONAL INFORMATION

The Institution responsible for formulating TS:

OBR J.S.C.