

	<p>TECHNICAL SPECIFICATION</p>	<p>WT-06/OBR PR/PD/60</p>
<p>Warter Fuels JSC</p>	<p>Aviation Gasoline B 91/115</p>	<p>Edition. IX</p>

1. Scope of TS
2. Usage scope of TS subject
3. Division and designation
4. Requirements and research
 - 4.1. General properties
 - 4.1.1. Antiknock additives
 - 4.1.2. Dyeing additives
 - 4.1.3. Antioxidant additives
 - 4.1.4. Antistatic additives
 - 4.1.5. Anticorrosive additives
 - 4.1.6. Durability
 - 4.1.7. Packaging , storage and transportation
 - 4.2. Specific properties
 - 4.2.1. Research
 - 4.2.2. Appearance evaluation
 - 4.2.3. Sampling
 - 4.2.4. Specific properties table for aviation gasoline B 91/115

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	TECHNICAL SPECIFICATION	WT-06/OBR PR/PD/60
Warter Fuels JSC	Aviation Gasoline B 91/115	Edition. IX

1. Scope of TS

The scope of TS is aviation gasoline AVGAS 100LL, which is the mixture of hydrocarbons, obtained from conservative and secondary processes of the crude petroleum and suitable amounts of antiknock, dyeing, antioxidant, anticorrosive and antistatic additives.

Requirements concerning TS subject were developed basing on the GOST 1012 standard.

2. Usage scope of TS subject

Aviation gasoline is used to power piston engines. The product meets the requirements of GOST 1012.

3. Division and designation

Division – N/A

Designation – Aviation Gasoline B 91/115

4. Requirements and research

4.1 General properties

The Producer is obliged to add dyeing and antiknock additives to the aviation gasoline. Other additives specified in this TS may also be used. The Producer is obliged to publish the name and quantity of the added additives in quality certificate. The aviation gasoline B 91/115 shall be produced in accordance with the clearly established technology.

4.1.1. Antiknock additives

As antiknock additives, mixtures of compounds containing not less than 61% (m / m) of tetraethyl lead and such amount of ethylene dibromide to provide two atoms of bromine per atom of lead are used. TEL - B ethyl liquid from Innospec / Alcor is used as a antiknock additive.

4.1.2. Dyeing additives

Aviation gasoline should contain the identifying green color additive Green "6 Ž" (fat-soluble or green anthraquin-fat soluble) in the amount of 6 mg / kg of gasoline.

4.1.3. Antioxidant additives

Antioxidant additives prevent from the formation of resins and other products of oxidation as well as from knocking out the lead compounds. The content of the additive based on the weight of the active ingredient, should not exceed 24,0 mg / l. As the antioxidant additive BHT (2,6-ditertbutyl-4-methylphenol) is used.

	TECHNICAL SPECIFICATION	WT-06/OBR PR/PD/60
Warter Fuels JSC	Aviation Gasoline B 91/115	Edition. IX

4.1.4. Antistatic additives

Antistatic additives prevent the formation of static electricity during pumping and refueling. Stadis 450 is used. The concentration of the additive in the gasoline should not exceed 3.0 mg / l.

4.1.5. Anticorrosive additives

Anticorrosive additives can be introduced into gasoline to prevent corrosion of both storage tanks and aircraft fuel systems. As an anti-corrosion additive, HITEC 580 is used, its concentration in aviation gasoline should not exceed 22.5 mg / l.

4.1.6. Durability

The aviation gasoline meets the requirements of TS within five years from the date of production under the condition of proper storage.

4.1.7. Packaging, storage and transportation

Aviation gasoline B 91/115 is delivered in a special tank trucks, iso-tank containers and steel drums approved for transport of aviation gasoline . Make sure that the packaging in which gasoline will be transported is clean, dry and undamaged. Each package unit as well as truck's transport documents should clearly and permanently indicate:

- Name of the gasoline
- Amount of gasoline In packaging unit
- Expiration date
- Warning of fire risk and safety instruction
- Commercial contrach number (if required)

Always store gasoline in containers that protects it from air, moisture and mechanical impurities. Storage places should be protected from direct sunlight, heating (underground tanks with limited air exchange). This reservation is for the reduction of both the losses associated with the evaporation and loss of the lightest components, which will change two key parameters of gasoline: vapor pressure and fractional composition. Tanks should be marked with information boards with the identification numbers of ADR threats and material identifying number: UN

33
1203

4.1. Specific properties

4.2.1. Research

For each batch of aviation gasoline (after the composing), the following analysis must be performed- in accordance with the requirements table:

- Appearance,
- Colour,

	TECHNICAL SPECIFICATION	WT-06/OBR PR/PD/60
Warter Fuels JSC	Aviation Gasoline B 91/115	Edition. IX

- Motor octane number (MON)
- Fractional composition,
- Sulfur content,
- Lead content,
- Density at temp=15°C,
- Specific energy,
- Freezing point,
- Copper corrosion,
- Existent gum,
- Reid vapour pressure at temp. =37,8°C,
- Iodine number,
- Aromatic hydrocarbons content
- pH of the water solution ,
- Acidity,
- Marking the resistance to oxidation – induction period method

Performance number determination, should be performed twice a year

The standards and requirements for these designations refer to the table of specific properties

4.2.2. Appearance evaluation

The test product should be poured into a glass cylinder with a diameter of 40 mm to 50 mm, made of clear glass ,then it should be visually inspected in transmitting light. The test should be performed at a temperature of $20 \pm 5^\circ\text{C}$. Gasoline meets the requirements, if the study is a clear liquid, without sediment, turbidity, and water.

4.2.3. Sampling

Sample should be taken from connection pipe of circulating pump after the mixing is finished (mixing time-min 4 hours) in amount of 5 liters for full research. Sampling bottles should be made of amber glass, and about 50 cm³ of air should be left, due to the liquid expandability Two bottles should be filled up to 0,8 dm³ (assigned for pressure analysis)).

4.2.4. Specific properties for Aviation gasoline B 91/115

#	Properties	Unit	Limits	Test method
1	Appearance	-	Meets the requirements	WT-06/OBR PR/PD/60 p.4.2.2 ASTM D 4176-04
2	Colour	-	Zielona	Visually
3	Antiknock rating - Motor Octane Number (MON) - Performance number*	- -	Min 91 Min 115	PN-EN 25163 ASTM D2700/IP236 ASTM D 909/IP119
4	Fractional composition: - initial boiling point	^o C	Min 40	PN-EN ISO 3405 ASTM D 86
	- 10 % (V/V)	^o C	Max 82	
	- 50 % (V/V)	^o C	Max 105	

	TECHNICAL SPECIFICATION	WT-06/OBR PR/PD/60
Warter Fuels JSC	Aviation Gasoline B 91/115	Edition. IX

	- 90 % (V/V)	°C	Max 145	
	- 97,5 % (V/V)	°C	Max 180	
	- residue	% (v/v)	Max 1,5	
	- loss	% (v/v)	Max 1,5	
5	Sulfur content	mg/kg	Max 300	ASTM D 2622 ASTM D 5453
6	Lead content	g Pb/l	Max 1,60	PN-92/C-04195 ASTM D 5059
	Tetraethyl Lead content	g CEO/kg	Max 2,5	GOST 1012 pkt. 2.4
7	Density at temp= 15 ⁰ C	kg/m ³	To be reported	PN EN ISO 3675 PN EN ISO 12185 ASTM D 4052
8	Specific energy	MJ/kg	Min 42,947	ASTM D 4529
9	Freezing point	°C	Max (-60)	ASTM D 2386/IP16 ASTM D 7153
10	Corrosion to copper strip-2h at 100 ⁰ C	Corrosion rate	Max 1	PN-EN ISO 2160 ASTM D 130/IP154
11	Existent gum	mg/100ml	Max 3	PN-EN ISO 6246 ASTM D 381/IP131
12	Iodine number	g J ₂ /100g	Max 2,0	PN-82/C-04068
13	Aromatic hydrocarbons content	% m/m	Max 35	ASTM D 1319 PN EN 15553
14	Reid vapor pressure at 37,8 °C	kPa	29,3 – 48,0	PN-EN 13016-1 ASTM D 5191
15	pH of the water solution	-	Neutral	PN-84/C-04064
16	Acidity	mg KOH/ 100cm ³	Max 0,3	PN-85/C-04066
17	Marking the resistance to oxidation – induction period method	Hour	Min 12	PN ISO 7536/Ap1

* Performance number determination, should be performed twice a year*

THE END
ADDITIONAL INFO
TECHNICAL SPECIFICATION ISSUED BY:
WARTER FUELS S.A.