



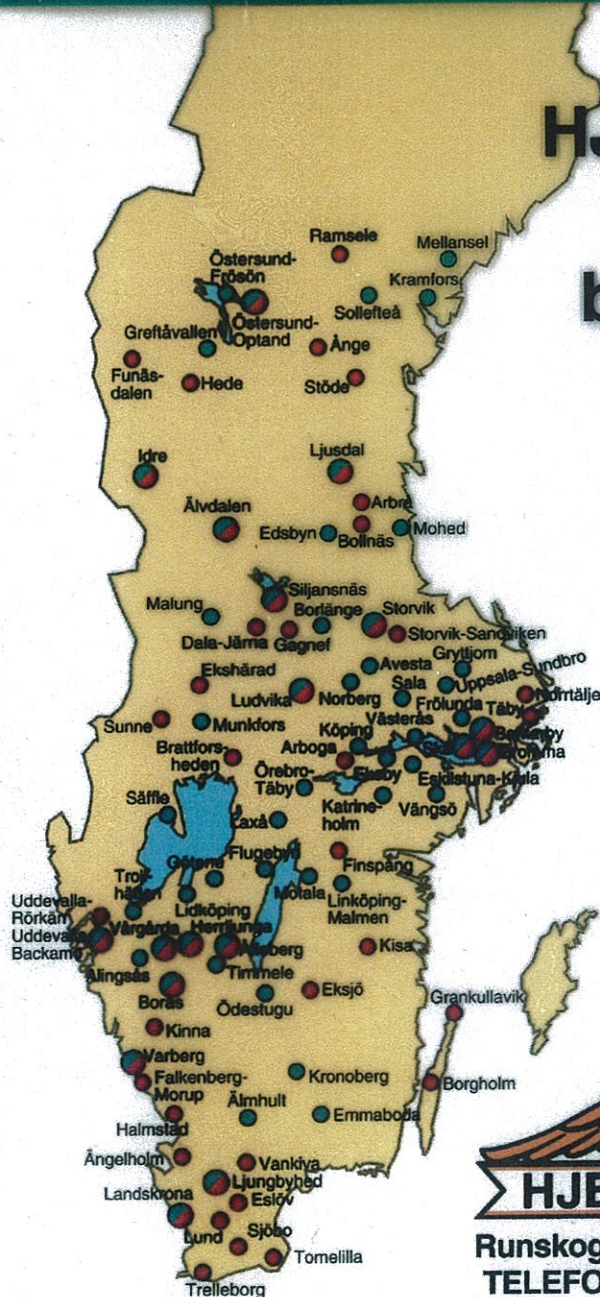
Lars H. Hjelmberg

AVGAS 100 LL

AVGAS 91/96 UL

HJELMCO OIL AB

Mycket mer än bara flygbränsle!



Verksamheten i f.d. Sovjetunionen drivs självständigt från HELMCOIL A/S med huvudkontor i Tallinn, Estland.

- AVGAS 100LL
- AVGAS 91/96UL



Runskogsvägen 4 B 191 48 SOLLENTUNA
TELEFON 08-626 93 86 FAX 08-626 94 16



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AVGAS

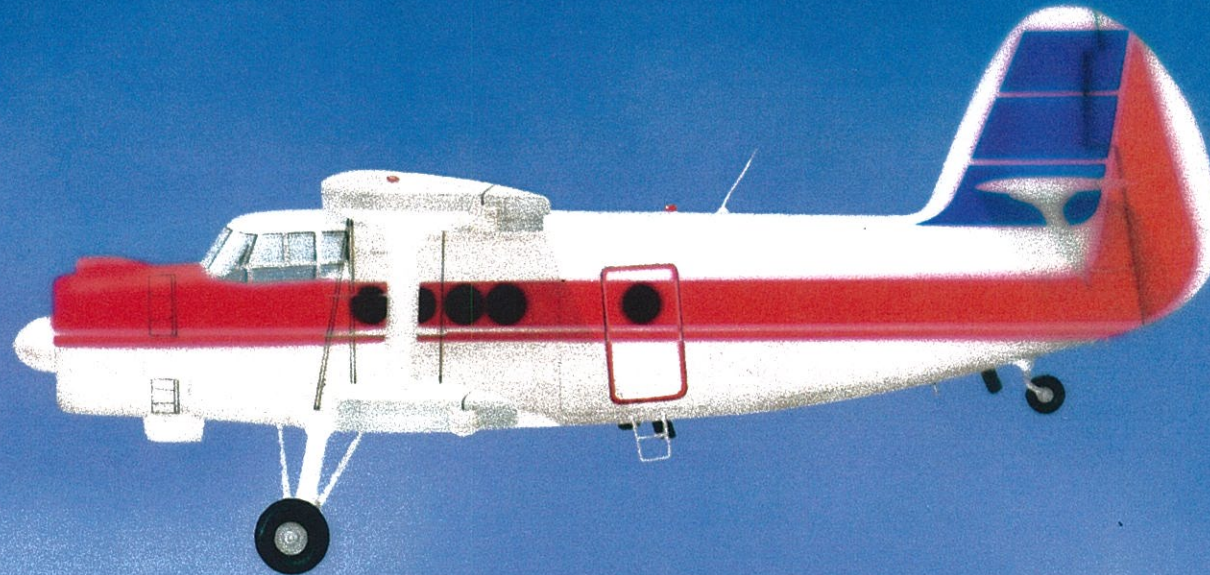
AVIATION GASOLINE STANDARDS

**RUSSIAN GHOST
AMERICAN ASTM**



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ANTONOV 2



GHOST 1012 STANDARD





AMERICAN ASTM D910 STANDARD

A STANDARD

**Parameters essential for
control of quality and suitability,
for example:**

OCTANE NUMBER: MINIMUM 100

TEST METHOD: ASTM D2700





Aviation gasolines, turbo fuels & lubricants.

HELMCOIL ESTONIA SHIPMENT JUNE 23 1997.

Sollentuna, June 19 1997.

LH/LH

**CERTIFICATE OF QUALITY
AVGAS 100 LL**

| | | | |
|-----------------------------------|-----------|--------------|--------------|
| Appearance | | B & C | D4176 Proc 1 |
| Octane number, Lean mixture | | 101,3 | ASTM D 2700 |
| Performance number, Rich mixture | | 135,3 | ASTM D 2700 |
| Tetraethyllead (TEL-B) g/l TEL | | | 101,3 |
| Colour | | | IP 17A |
| Heat value, net | MJ/kg | 43,72 | ASTM D 4529 |
| Aniline Point | | 55,2 | ASTM D 611 |
| Density at 15 degr C. | kg/m3 | 720,6 | ASTM D 4052 |
| Initial Boiling Point | degr C. | 31,9 | ASTM D 86 |
| Evaporated 10 vol % at | degr C. | 68,2 | |
| Evaporated 40 vol % at | degr C. | 100,2 | |
| Evaporated 50 vol % at | degr C. | 102,6 | |
| Evaporated 90 vol % at | degr C. | 109,2 | |
| Final Boiling Point at | degr C. | 146,7 | |
| Sum of 10%+50%, evaporated | C. | 170,8 | |
| Recovery | vol-% | 97,6 | |
| Residue | vol-% | 1,3 | |
| Loss | vol-% | 1,1 | |
| Evaporated at 75 degr C. | vol-% | not recorded | |
| Evaporated at 105 degr C | vol-% | not recorded | |
| Reid Vapour Pressure (RVP) kPa | | 39,77 | ASTM D 323 |
| Freezing Point | degr C. | <-80,0 | ASTM D 2386 |
| Total Sulphur | wt -% | 0,004 | ASTM D 2622 |
| Copper Corrosion, 2 hours | | | |
| at 100 degr C. | | 1 | ASTM D 130 |
| Existent Gum | mg/100 ml | <1 | ASTM D 381 |
| Oxid.Stability, Potent Gum | | | |
| (16 h) | mg/100 ml | <1 | ASTM D 873 |
| Lead Precipitate | mg/100 ml | none | ASTM D 873 |
| Water reaction, Interface Rating | | 1 | ASTM D 1094 |
| Water reaction, Separation Rating | | 1 | ASTM D 1090 |
| Water reaction, Volume change | ml | <0,5 | ASTM D 1090 |
| Total Acid Number (TAN) | mg KOH/g | | ASTM D 974 |
| Dye | mg/l | 2,0 | |
| Antioxidant | mg/l | 11 | |
| Total fluorine | | --- | NM134 |
| Benzene | vol-% | <0,01 | NM99 |

Octane number, Lean mixture

ASTM D 2700

Hjelmco
1 QUALITY.16/TXHELMCO

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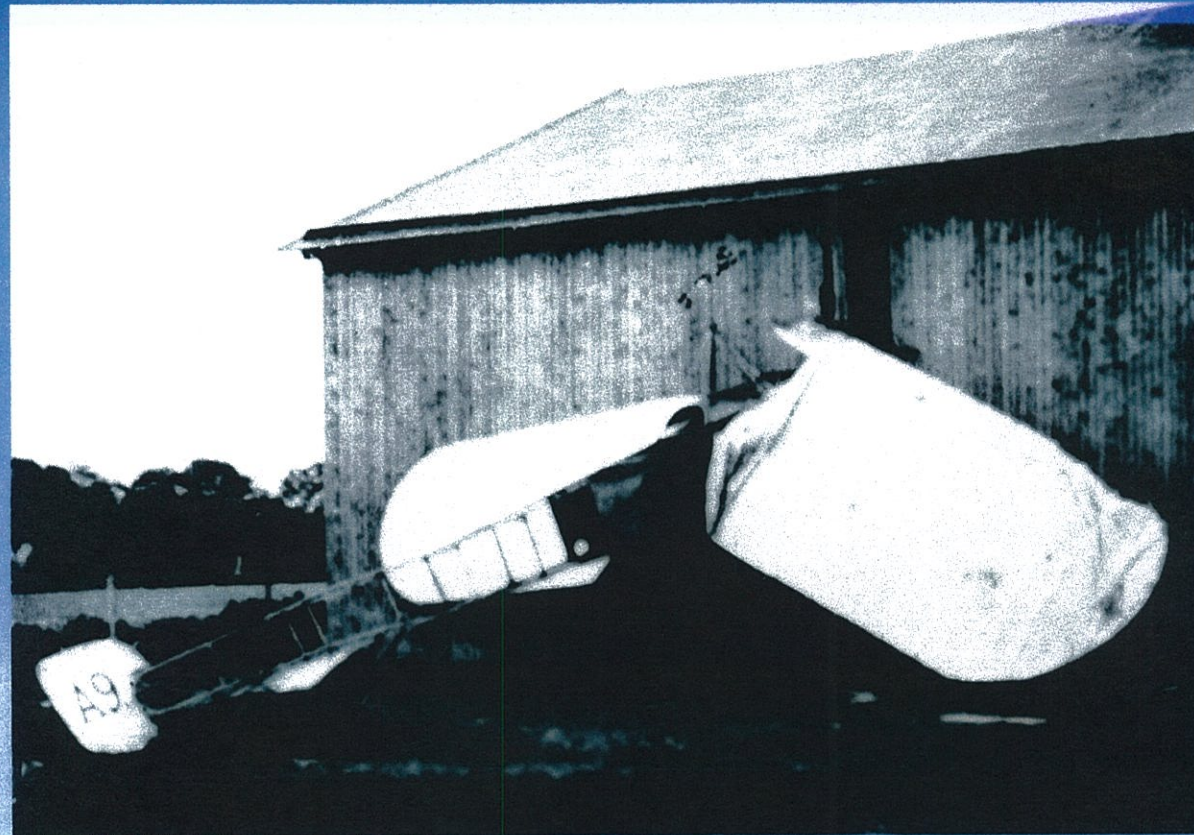
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THE NEED FOR AN AVIATION GASOLINE STANDARD

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QUALITIES OF AVGAS

RUSSIAN 78 91/115 95/130

AMERICAN 80/87 100/130 100/130 LL (100 LL)

RUSSIAN AVGAS 91/115

91 = octane rating at lean mixture

**115 = supercharge (compressor)
rating at rich mixture**

AVGAS COLOURS

RUSSIAN 91/115

AMERICAN 100/130



**Both are
GREEN!**

**An American in Russia
could make a fatal mistake!**



THE RUSSIAN AVIATION GASOLINE STANDARD GHOST 1012

| | | | |
|--------------------------------|--------|--------|----------------|
| Octane lean | 78 | 91 | 95 |
| Octane supercharge | -- | 115 | 130 |
| Colour | ? | green | red or yellow. |
| Max lead gram/lit | 0.44 | 1.83 | 2.26 |
| Start of destillation degr. C. | 40 | 40 | 40 |
| 10 % at max | -- | 82 | 82 |
| 50 % at max | 105 | 105 | 105 |
| 90 % at max | 145 | 145 | 145 |
| 97,5 % at max | 180 | 180 | 180 |
| Residue & loss max % | 2.5 | 2.5 | 2.5 |
| Net heat Kcal/kg | 10.300 | 10.300 | 10.300 |
| Vapour pressure minimum kPa | 27.3 | 28.6 | 28.6 |
| maximum kPa | 48 | 48 | 48 |
| Sulphur max weight % | 0.05 | 0.05 | 0.05 |
| Freezing point max degr. C. | -60 | -60 | -60 |
| Maximum amount of aromatics % | 20 | 35 ? | 35 ? |



THE AMERICAN AVIATION GASOLINE STANDARD ASTM D 910.

| | | | |
|-----------------------------------|--|--------|--------|
| Octane lean | 80 | 100 | 100 |
| Octane supercharge | 87 | 130 | 130 |
| Colour | red | blue | green |
| Max lead gram/lit | 0.15 | 0.56 | 1.2 |
| Start of destillation degr. C. | -- | -- | -- |
| 10 % at max | 75 | 75 | 75 |
| 50 % at max | 105 | 105 | 105 |
| 90 % at max | 135 | 135 | 135 |
| 97 % at max | 170 | 170 | 170 |
| 97,5 % at max | --- | --- | --- |
| Residue & loss max % | 3.0 | 3.0 | 3.0 |
| Net heat Kcal/kg | 10.400 | 10.400 | 10.400 |
| Vapour pressure minimum kPa | 38 | 38 | 38 |
| maximum kPa | 49 | 49 | 49 |
| Sulphur max weight % | 0.05 | 0.05 | 0.05 |
| Freezing point max degr. C. | -58 | -58 | -58 |
| Maximum amount of aromatics | limited by energy content normally 15 - 20 %. | | |



MAJOR DIFFERENCES BETWEEN RUSSIAN AND AMERICAN AVIATION GASOLINES

- OCTANE NUMBERS**
- AMOUNT OF LEAD**
- AROMATIC CONTENTS**



RUSSIAN VERSUS AMERICAN AVGAS SEEN FROM AN AMERICAN SIDE

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DIFFERENCE

POTENTIAL PROBLEMS

TOO LOW OCTANE
NUMBERS

LOSS OF POWER
BROKEN PISTONS
CRACKED CYLINDERS

TOO MUCH LEAD

FOULED SPARK PLUGS
FOULED VALVES

TOO MUCH
AROMATICS

HIGHER FUEL CONSUMPTION
ELASTOMERS SWELL
FUEL LEAKAGE



RUSSIAN VERSUS AMERICAN AVGAS SEEN FROM A RUSSIAN SIDE

DIFFERENCE

**TOO LOW AROMATIC
CONTENT**

**TOO LOW LEAD
CONTENT**

POTENTIAL PROBLEMS

**SHRINKING ELASTOMERS
FUEL LEAKAGE
HIGHER ENGINE TEMPERATURE**

**ABNORMAL VALVE WEAR
HIGHER ENGINE TEMPERATURE**

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A NEW GASOLINE FOR BOTH RUSSIAN AND AMERICAN AIRCRAFT ENGINES

**HJELMCO OIL HAS THE
COMPETENCE AND INTEREST TO
CO-OPERATE AND CREATE
THIS FUEL !**

