MAGNAGHI AERONAUTICA SpA

LSA

NOTIFICATION

SERVICE DOCUMENT NOT 1_2016 Sky Arrow Issue 1	DATE *7/18/2016*
APPROVAL REF.	☒ ***CHANGE*** / ☐ ***REPAIR***

SUBJECT: **SUITABLE FUELS FOR SKY ARROW LSA AIRCRAFT**

APPLICABILITY: **SKY ARROW LSA SERIE**

This Service Document is

☐	**MANDATORY**	☐	**RECOMMENDED**	☒	**OPTIONAL**

1. Failing to comply with the mandatory Service Document may immediately get the aircraft not airworthy.
2. Failing to comply with the recommended Service Document does not directly reduce the flight safety of the aircraft.
3. Failing to comply with the optional Service Document does not affect the safety of the aircraft. Compliance improves the comfort or the performance of the aircraft.

COMPLIANCE TERMS: **This Service Document is optional**

STATEMENT / ADDITIONAL NOTES:
The technical content of this document is issued under the alternative procedure to DOA ref. EASA.AP180, approved by EASA.

DRAFTED BY:	APPROVED BY:
Domenico Lamanna (Tech. Dept.)	Giorgio Iannotti (Head of Design Organization)

1. PREMISE AND SCOPE

This Notification has been issued mainly after feedback from the field from US customers, not able to easily find MOGAS unleaded ethanol free fuel, according to ASTM D4814 standard and claiming against damage to Rotax engines occurring when AVGAS 100 LL fuel used; currently available automotive fuel in USA is mainly blended with 10% of Ethanol and various Octane grades.

This Notification aims to supply to Sky Arrow fleet information about techniques, procedures and limitations for each kind of suitable fuel. It is applicable to Sky Arrow LSA serie flying in USA, Brazil and other countries where the type above has been validated according to applicable ASTM standards.

Latest revision of this notification is available through the website www.skayrrow.it.

2. INFORMATION ON MATERIALS AND LABOUR

The activities described in this Notification must be managed and performed by an approved LSA Powerplant & Airframe mechanic.

3. INVOLVED DOCUMENTS

3.1 Airplane docs

- Pilot's Operating Handbook - AFM-001-2012 Sky Arrow-Issue1, currently at rev. 1 dated 15th June, 2015
- Airplane Maintenance Manual - AMM-001-2012 Sky Arrow-Issue 1, currently at rev. 1 dated 15th June, 2015.

3.2 Rotax Service Instruction

SI-912-016 "Selection of operating suitable fluids", currently at rev. 8 dated 16th April, 2015.

3.3 FAA recommendations

- Advisory Circular Letter – AC 23.1521-2
- Special Airworthiness Information Bulletin – CE-07-06

3.4 EASA Service documentation

Safety Information Bulletin – SIB 2009-02.

4. GENERAL RECOMMENDATIONS

Magnaghi Aeronautica SpA recommends MOGAS automotive unleaded ethanol free fuel for Sky Arrow aircraft, according to ASTM D4814 standard, grade minimum 91 AKI and minimum 95 RON, as also per Rotax SI-912-016 prescriptions. If automotive unleaded ethanol free above is not available, AVGAS UL94 (for instance, developed by Swift Fuels), also compliant with ASTM D7547 and D4814 standards, is recommended; such fuel is unleaded and ethanol free, also exceeding minimum octane grade prescribed. If the both fuels above are not available, AVGAS 100 LL is advised; refer to Airplane Maintenance Manual for special maintenance prescriptions related to use of AVGAS 100 LL fuel.
UL94 fuel is available as per locations mapped, for instance, at the website www.swiftfuels.com.
Then, only if none of the fuels above are available, E10 fuel compliant with ASTM D4814 is also tolerated, with minimum 93 AKI octane grade: usually in USA fuel is sold by AKI number, (R+M)/2 method. Such statement has been established considering Rotax Service Instruction at Para. 3.2 and after tests by:

- immerging in E10 fuel the components sampling the aircraft fuel system, to check fuel aging and material compatibility: glass and carbon fiber laminated with epoxy resin from fuel tank, gaskets, o-rings, fittings, rubber hoses, valves and filters
- comparing under tensile test glass and carbon samples with same samples not immerged into E10 fuel.

Summarizing, the suitable fuels for Sky Arrow LSA are classified as per below table:

Commercial definition	***Standard reference***	***Min. Grade (AKI)***	***Remarks***
MOGAS unleaded ethanol free	ASTM D4814	91 min.	Recommended
AVGAS UL 94	ASTM D4814 and D7547		
AVGAS 100 LL	ASTM D910		Advised, if recommended fuels not available
MOGAS E10	ASTM D4814	93 min.	Tolerated, if none of the above fuels available, according to prescriptions at Para. 4.1

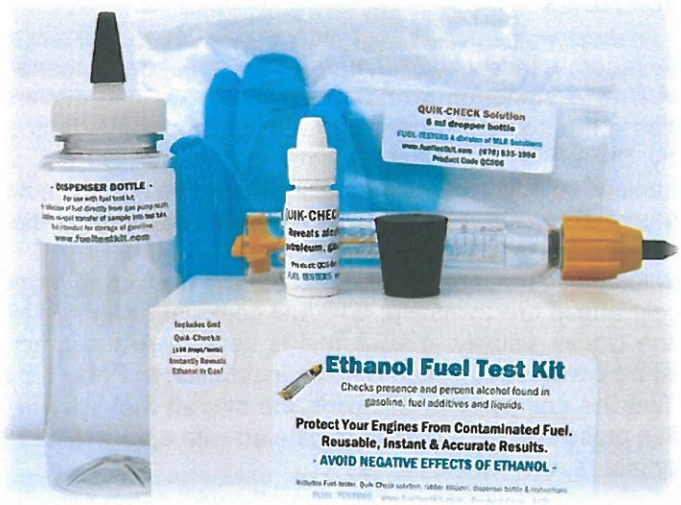
It is here also emphasized that:

- re-fuelling must be done through a water / fuel separator funnel
- at every pre-flight inspection, sampling of fuel with cup must be performed at the gascolator filter.

4.1 Limitations for E10 fuel

When E10 fuel is used, the following prescriptions must be followed:

- the owner / operator must be aware that the use of ethanol blended fuel affects the way the aircraft should be maintained and operated and about the potential effects of use of ethanol blended fuel, by reading and comprehending the information at Para. 3.2 and 3.3.
- it must be verified content of ethanol in the fuel is not exceeding 10%, for instance with EAA #2265797900000 fuel tester. It is the operator's responsibility to determine that the fuel used satisfies the approved fuel requirements



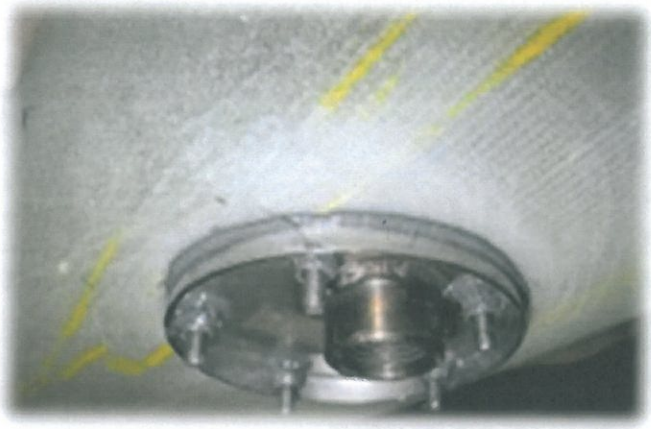
- in order to avoid any phase separation issues (ethanol can easily mix with water coming from moisture and separate from fuel after saturation, by settling down the bottom layer of the fuel tank), the tank must be drained if the airplane is going to be not used for more than 30 days; then, re-fuel the aircraft either with MOGAS with 0 ethanol content or AVGAS 100 LL and run the engine long enough to burn off the ethanol blended fuel in the fuel system
- also carburetors bowls must be empty if airplane is not used for more than 30 days, being ethanol corrosive
- the ethanol blended fuel into the tank must be replaced with fresh fuel every 2 weeks, at least
- gaskets, filters, tank sealant (see also Para. 4.1.1), hoses must be especially checked during every 50 fh inspections; considering ethanol is a very aggressive solvent, then, any dirt particles that are enclosed in the fuel system can be washed out and can obstruct filters, pumps and carburetors
- at every pre-flight inspection the bottom of the fuselage fuel tank must be inspected in order to visually detect evidence of layering
- E10 fuel can't be mixed to different types of fuel into the tank.

4.1.1 Retrofit for E10 fuel

Sky Arrow in LSA category from serial number LSA022 (included) on can tolerate E10 fuel as they are. In order to tolerate E10 fuel, Sky Arrow LSA up to serial number LSA021 (included) must be updated as follows:

- top and bottom cork gaskets at the upper and lower flanges of the fuselage fuel tank (R09000-06/00 and R09000-07/00) must be removed and replaced with ProSeal P/S 890 Class B compound

For mixing ratio and curing time look at the attached datasheet (Annex 1); fuel tank must be empty, the flanges removed, the parts to be sealed must be cleaned and sanded before.



Lower flange of the fuselage fuel tank sealed with ProSeal

Retrofitting must be recorded on the aircraft logbook.

ANNEX 1 – PROSEAL DATASHEET

PPG Aerospace
PRC-DeSoto

TECHNICAL DATA

P/S 890 Class B Fuel Tank Sealant

Description

P/S 890 Class B is an aircraft integral fuel tank sealant. It has a service temperature range from -65°F (-54°C) to 250°F (121°C), with intermittent excursions up to 275°F (135°C). This material is designed for fillet sealing of fuel tanks and other aircraft fuselage sealing applications. The cured sealant maintains excellent elastomeric properties after prolonged exposure to both jet fuel and aviation gas.

P/S 890 Class B is a two-part, manganese dioxide cured polysulfide compound. The uncured material is a low sag, thixotropic paste suitable for application by extrusion gun or spatula. It cures at room temperature to form a resilient sealant having excellent adhesion to common aircraft substrates.

The following tests are in accordance with AMS-S-8802 Class B specification test methods.

Application Properties (Typical)

Color	
Part A	Black
Part B	White
Mixed	Gray
Mixing ratio By weight	Part A:Part B 10:100
Base viscosity (Brookfield #7 @ 2 rpm), Poise (Pa-s)	11,000 (1100)

Slump, inches (mm)

	Initial	50 Minutes	90 Minutes
B-1/2	0.15 (3.81)	—	—
B-2	0.30 (7.62)	0.20 (5.08)	0.20 (5.08)
B-4	0.15 (3.81)	0.20 (5.08)	0.20 (5.08)

Application life and cure time @ 77°F (25°C), 50% RH

	Application life (hours)	Tack free time (hours)	Cure time to 35 A Durometer (hours)
B-1/2	1/2	<4	7
B-2	2	<6	10
B-4	4	<36	90

Performance Properties (Typical)

Cured 14 days @ 77°F (25°C), 50% RH	
Cured specific gravity	1.55
Nonvolatile content, %	95
Ultimate cure hardness, Durometer A	49
Peel strength, pli (N/25 mm), 100% cohesion	
JRF(AMS 2629) Immersion, 7 days @ 140°F (60°C)	
AMS 2471 (Anodized aluminum)	41 (182)
MIL-C-5541 (Alodine aluminum)	42 (187)
AMS-C-27725 (IFT coating)	44 (196)
MIL-S-5059 (Stainless steel)*	44 (196)
AMS-T-9046 (Titanium comp. C)*	43 (191)
AMS-QQ-A-250/13 (Alclad)	39 (173)
JRF(AMS 2629)/NaCl-H_2O Immersion, 7 days @ 140°F (60°C)	
AMS 2471 (Anodized aluminum)	39 (173)
MIL-C-5541 (Alodine aluminum)	40 (178)
AMS-C-27725 (IFT coating)	43 (191)
MIL-S-5059 (Stainless steel)*	42 (187)
AMS-T-9046 (Titanium comp. C)*	45 (200)
AMS-QQ-A-250/13 (Alclad)	42 (187)

*Primed with PR-148 Adhesion Promoter

Tensile strength, psi (kPa)	
Standard cure, 14 days @ 77°F (25°C), 50% RH	300 (2069)
14 days Immersion in JRF(AMS 2629) @ 140°F (60°C)	270 (1862)
7 days @ 250°F (121°C)	420 (2896)
72 hours Immersion in JRF(AMS 2629) @ 140°F (60°C), + 72 hours @ 120°F (49°C), + 7 days @ 250°F (121°C)	350 (2413)
24 hours @ 250°F (121°C), + 7 days Immersion in JRF(AMS 2629) @ 140°F (60°C)	325 (2241)
Elongation, %	
Standard cure, 14 days @ 77°F (25°C), 50% RH	300
14 days Immersion in JRF(AMS 2629) @ 140°F (60°C)	350
7 days @ 250°F (121°C)	150
72 hours Immersion in JRF(AMS 2629) @ 140°F (60°C), + 72 hours @ 120°F (49°C), + 7 days @ 250°F (121°C)	125
24 hours @ 250°F (121°C), + 7 days Immersion in JRF(AMS 2629) @ 140°F (60°C)	200

P/S 890 Class B Fuel Tank Sealant

Thermal rupture resistance - Retains pressure of 10 psi with only negligible deformation, both before and after immersion in JRF(AMS 2629).

Low temperature flexibility @ -65°F (-54°C) - No cracking, checking or loss of adhesion.

Corrosion resistance - No corrosion, adhesion loss, softening, or blistering after 20-day immersion in 2-layer salt water/JRF(AMS 2629) @ 140°F (60°C).

Resistance to hydrocarbons - 7 days @ 140°F (60°C) immersed in JRF(AMS 2629).

Weight loss, %	5.0

Flexibility - No cracks after bending 180 degrees over 0.125 inch (3.18 mm) mandrel.

Repairability to itself - Excellent to both freshly cured as well as fuel aged and abraded fillets.

Resistance to other fluids - Excellent resistance to water, alcohols, petroleum-base and synthetic lubricating oils, and petroleum-base hydraulic fluids.

Fungus resistance	Non-nutrient

Note: The application and performance property values above are typical for the material, but not intended for use in specifications or for acceptance inspection criteria because of variations in testing methods, conditions and configurations.

Surface Preparation

Immediately before applying sealant to primed substrates, the surfaces should be cleaned with solvents. Contaminants such as dirt, grease, and/or processing lubricants must be removed prior to sealant application.

A progressive cleaning procedure should be employed using appropriate solvents and a new lint-free cloth conforming to AMS 3819. (Reclaimed solvents or tissue paper should not be used.) Always pour solvent on the cloth to avoid contaminating the solvent supply. Wash one small area at a time.

It is important that the surface is dried with a second clean cloth prior to the solvent evaporating to prevent the redeposition of contaminants on the substrate.

Substrate composition can vary greatly. This can affect sealant adhesion. It is recommended that adhesion characteristics to a specific substrate be determined prior to application on production parts or assemblies.

For a more thorough discussion of proper surface preparation, please consult the SAE Aerospace Information Report AIR 4069. This document is available through SAE, 400 Commonwealth Avenue, Warrendale, PA 15096-0001.

Packing Options

P/S 890 Class B is supplied in two-part kits and Semco® cartridges.

Mixing Instructions

Mix according to the ratios indicated in the application properties section. Mix Part A and Part B separately to uniformity, then thoroughly mix entire contents of both parts of the kit together taking care to avoid leaving unmixed areas around the sides or bottom of the mixing container.

Storage Life

The storage life of P/S 890 Class B is at least 9 months when stored at temperatures below 80°F (27°C) in original, unopened containers.

Health Precautions

This product is safe to use and apply when recommended precautions are followed. Before using this product, read and understand the Material Safety Data Sheet (MSDS), which provides information on health, physical and environmental hazards, handling precautions and first aid recommendations. An MSDS is available on request. Avoid overexposure. Obtain medical care in case of extreme overexposure.

For industrial use only. Keep away from children.

For emergency medical information call 1-800-228-5635.

Additional information can be found at: www.ppgaerospace.com

For sales and ordering information call 1-800-AEROMIX (237-6649).

Printed in U.S.A.

PRC-DeSoto International, Inc.
12780 San Fernando Road
Sylmar, CA 91342
Telephone (818) 362-6711
Toll Free (800) AEROMIX
www.ppgaerospace.com

Issue Date: 12/09
Supersedes: 09/09
Lit: 0133