

## **Austausch Kühlflüssigkeit** **Exchange Coolant**

### **A TECHNISCHE ANGABEN**

#### **A-1 Betroffene Flugzeuge**

AQUILA AT01 Alle Werknummern

#### **A-2 Gegenstand**

Austausch der Kühlflüssigkeit gemäß Rotax Service Bulletin Nr.: 912-043

#### **A-3 Anlass**

Gemäß LBA-LTA-Nr. D-2004-491R1 und AD - Nr. A-2004-004R1 von austro control ist das SB 912-043 für alle Flugzeuge mit Rotax 912S-Antrieb umzusetzen.

#### **A-4 Information**

Der Austausch der Kühlflüssigkeit ist entsprechend den Vorgaben im Rotax Service Bulletin und spätestens bis zum 31.12.2005 (siehe AD austro control) durchzuführen. Der Einsatz von EVANS NPG+ Kühlflüssigkeit in der AQUILA AT01 führt zu einer leichten Erhöhung der Zylinderkopftemperatur, die jedoch unter allen zulässigen Betriebsbedingungen unter dem zulässigen Grenzwert von 135°C bleibt. Langzeiterfahrungen liegen bis jetzt noch nicht vor.

### **B SONSTIGES**

EVANS NPG+ Kühlflüssigkeit darf nicht mit Wasser oder einer anderen Kühlflüssigkeit gemischt werden, daher ist die ständige Mitführung eines Reservebehälters (ca. 0,5 l) empfehlenswert.

### **A TECHNICAL DETAILS**

#### **A-1 Airplanes affected**

AQUILA AT01 All serial numbers

#### **A-2 Subject**

Exchange of coolant according to ROTAX Service Bulletin No.: 912-043

#### **A-3 Reason**

Following the instructions of LBA-LTA No. D-2004-49R1R and austro control AD A-2004-004R1 actions of ROTAX SB-912-043 have to be accomplished for all aircraft with a 912S Rotax powerplant.


#### **A-4 Information**

The exchange of coolant has to be accomplished according to the Service Bulletin instructions not later than 31.12.2005 (AD austro control).  
Operating AQUILA AT01 with EVANS NPG+ coolant shows a slight raise in cylinderhead temperature within the operating envelope without exceeding the limit temperature of 135°C. Experiences and effects out of longtime Operation are not yet available.

### **B OTHER INFORMATION**

It is not allowed to mix EVANS NPG+ coolant with water or any other coolant.  
It is recommended to equip the aircraft with a spare bottle (0,5 l) of coolant.

Schoenhagen 30/05/2005



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# SERVICE BULLETIN

## CHANGE OF COOLANT SPECIFICATION ON ROTAX, ENGINE TYPE 912 AND 914 (SERIES)

SB-91 2-043

SB-91 4-029

### **MANDATORY**

#### Repeating Symbols:

Please, pay attention to the following symbols throughout this document emphasizing particular information.

- ▲ **WARNING:** Identifies an instruction, which if not followed, may cause serious injury or even death.
- **CAUTION:** Denotes an instruction which if not followed, may severely damage the engine or could lead to suspension of warranty.
- ◆ **NOTE:** Information useful for better handling.

#### 1) Planning information

##### 1.1) Engines affected

All Versions of the engine type:

- 912 A all
- 912 F all
- 912s all
- 914F all

##### 1.2) Concurrent ASB/SB/SI and SL

More to this Service Bulletin the following additional Service Bulletin must be observed and complied with:

- SB 912-039 / SB-91 4-025 "Modifications of the overflow bottle" current issue

##### 1.3) Reason

In some instances conventional coolant (mixture ratio of 50% Water and 50% antifreeze) can vaporize or boil before the maximum permissible cylinder head temperature is reached.

##### 1.4) Subject

Change of coolant specification on ROTAX, engine type 912 (Series) and 914 (Series)

##### 1.5) Compliance

- Within the next 100 operating hours, but at the latest by December 31, 2004, the newly specified coolant specifications are to be observed according to the following Instruction section 3 and applied.

▲ **WARNING:** Non-compliance with these instructions could result in engine damages, personal injuries or death.

##### 1.6) Approval

The technical content of this document is approved under the authority of DOA Nr. MOT. JA-03.

##### 1.7) Manpower

Engine installed in the aircraft --- manpower time will depend on installation and thus, no estimate is available from the engine manufacturer.

##### 1.8) Mass data

Change of weight --- none

Moment of inertia --- unaffected

003276

**1.9) Electrical load data**

Nochange

**1.10) Software accomplishments summary**

Nochange

**1.11) References**

In addition to this technical information refer to **current** issue of

- Operators Manual (OM)
- Illustrated Parts Catalog (IPC)
- Maintenance Manual (MM)

**1.12) Other publications affected**

The following documentation must be replaced without any delay in accordance with this Service Bulletin and will become invalid.

Description	part no.	Issue	Date	Rev.	Chapter	Page
SL-912-009/914-008	n. a.		Dec. 2003	1		

The following documentations become effective with this Service Bulletin:

Description	part no.	Issue	Date	Rev.	Chapter	Page
Operator's Manual 912 Series	899370	0	1998 07 01	3		
Operator's Manual 914 Series	899641	0	1998 12 01	3		
Installation Manual 912 A	897860	0	1997 01 16	1		
Installation Manual 912 F	897796	0	1996 01 23	2		
Installation Manual 912 S	899376	0	1998 09 01	1		
Installation Manual 912 UL	897711	2	1997 03 26	1		
Installation Manual 914 F	897816	0	1996 05 10	1		

The replacement pages have to be included without delay into the respective documentation of the aircraft manufacturer.

**1.13) Interchangeability of parts**

Not affected

## 2) Material Information

### 2.1) Material - cost and availability

Prices and availability can be inquired about at:



07014

Evans Cooling Systems  
www.evanscooling.com

#### **USA, Central and South America, Australia, Asia and Canada:**

Evans Cooling Systems Inc. Sales and Warehouse Office  
PO Box 434  
Parkerford, PA 19457-0434, USA  
Tel.: 001 6103233114  
Fax: 001 6109700286  
email: evans.npg@verizon.net  
Contact Cathy or Dave

#### **Europe, the Middle East and Africa:**

RENOX S.n.c.  
Via Bologna, 12  
600 19 Senigallia AN, Italy  
Tel.: +39 071 792 7942  
Fax: +39 0717910343  
email: renox@renox.com  
Contact Alex Priori

#### **Northern Europe (The UK, Holland, Scandinavia etc)**

GEARFOX UK  
Charterhouse  
106 Baker Street, Marylebone, London.  
Tel: +44 20 74861970/1862  
Fax: +44 20 7935 3268  
email: dan.sargent@gearfox.co.uk  
Contact: Dan Sargent

... or will be supplied on request by ROTAX, Authorized Distributors or their Service Center.

Contact your local ROTAX, Authorized Distributor as listed in the Operator's Manual or published on our official web-site at: [www.rotax-aircraft-engines.com](http://www.rotax-aircraft-engines.com)

### 2.2) Company support information

None

### 2.3) Material requirement per engine

parts requirement:

Fig.no.	New part no.	Qty/engine	Description	Old part no.	Application
(1)	n.a.	as required	NPG+™ coolant liquid		cooling system

◆ NOTE: The required coolant quantity depends on the installation. In case of doubt contact your aircraft manufacturer.

### 2.5) Rework of parts

None

### 2.6) Special tooling/lubricant/adhesives/sealing compound - Price and availability

Price and availability will be supplied on request by ROTAX, Authorized Distributors or their Service Centers.

Parts requirement:

Fig.no.	part no.	Qty/engine	Description	Old part no.	Application
(1)	898490	1	warning sticker		radiator cap

### 3) Accomplishment / Instructions

#### Accomplishment

All the measures must be taken and confirmed by the following persons or facilities:

- ROTAX<sup>®</sup> -Airworthiness representative
- ROTAX, -Distributors or their Service Centers
- Persons approved by the respective Aviation Authority

▲ WARNING: Proceed with this work only in a **non-smoking** area and not **close to sparks** or open flames. **Switch off** ignition and secure engine against unintentional Operation. Secure aircraft against unauthorized Operation. Disconnect negative terminal of aircraft battery.

▲ WARNING: Risk of scalds and burns! **Allow** engine to cool sufficiently and use appropriate safety equipment while performing work

▲ WARNING: Should removal of a **locking device** (namely **lock tabs**, self-locking fasteners) be required when undergoing **disassembly/assembly**, always replace with a new one.

◆ NOTE: All work has to be performed in accordance with the relevant Maintenance Manual.

#### 3.1) Coolant specification

The coolant specification is to be used according to the corresponding Operators Manual **current** issue, and according to the time schedules in **section** 1.5.

■ CAUTION: The safety-technical data of the coolant manufacturer must be observed!

#### 3.2) Changing the coolant

(see fig. 1)

The coolant is to be replaced according to the Maintenance Manual, **current** issue.

■ CAUTION: The manufacturer's data for **change/replacement**, usage, and Operation of the previously described coolant are to be observed. See Appendix **section**. 4.2.

◆ NOTE: On the radiator cap (3), to identify the new coolant, the warning label (2) is to be affixed so that the opening pressure data (4) is visible.

▲ WARNING: Water or water-containing coolant must **not** be added in **any case** to the cooling System!

- **Restore** aircraft to original operating configuration.
- Connect negative terminal of aircraft battery.

#### 3.3) Test run

Conduct test run including ignition check and leakage test.

#### 3.4) Summary

These instructions (**section** 3) have to be conducted in compliance with **section** 1.5.

Approval of translation to best knowledge and judgment - in any **case** the original text in the German language and the **metric units** (SI-System) are authoritative.

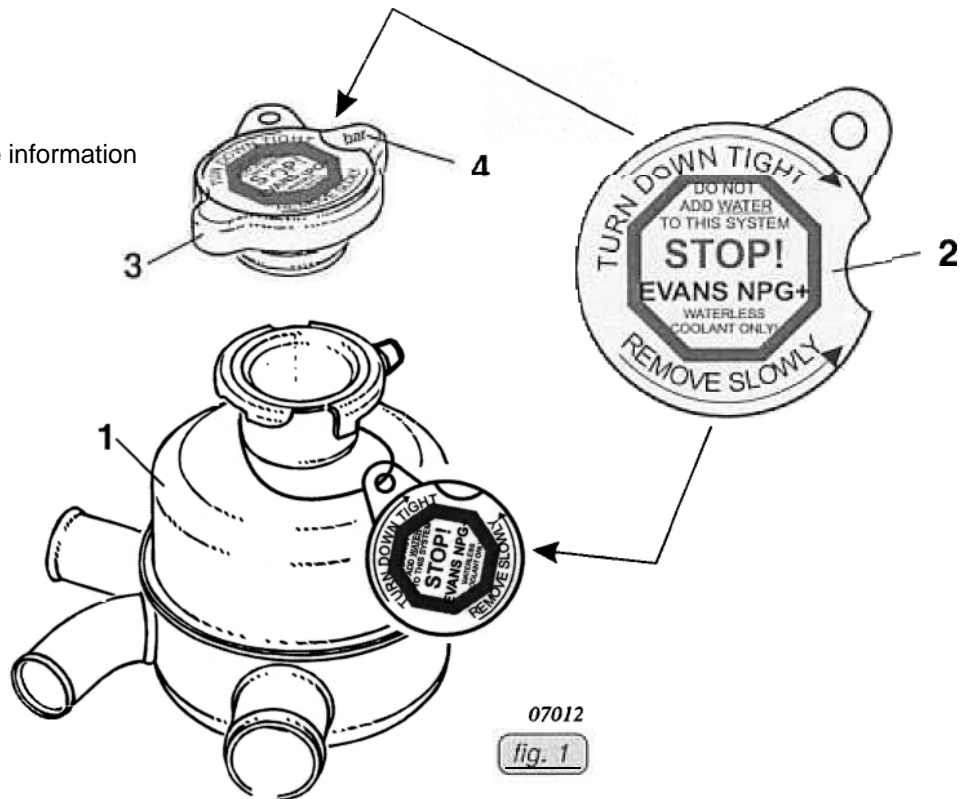
## 4) Appendix

### 4.1) Sticker

The following drawings should provide additional information: See fig. 1

- For new engine deliveries the sticker will be temporarily attached to the expansion tank.
- The sticker has to be affixed to the radiator cap in accordance to the aircraft manufacturer's instruction.

- 1 Expansion tank
- 2 Warning sticker
- 3 Radiator cap
- 4 Excess-pressure information



+ NOTE: The illustrations in this document show the typical construction. They may not represent full detail or the exact shape of the parts which have the same or similar function. Exploded views are **not technical** drawings and are for reference only. For specific detail, refer to the **current** documents of the respective engine type.

### 4.2) Manufacturer Instruction

An NPG+ Instruction Manual is included in each scope of supply and also available on the official web-site of the manufacturer and includes detailed instructions about the operation and application of EVANS NPG+.

The coolant system of the ROTAX engine type 912/914 is designed for the Operation with waterless coolant and therefore has not to be modified. The drain holes /venting holes should not be plugged.

#### 4.2.1) Warning notices for Operation with EVANS NPG+

- Water or water-containing coolant must **not** be added in any case to the cooling system!
  - 3,6 % water or less in the system is acceptable and may be checked with a brix scale refractometer.
  - Residual water, if present, will vent rapidly as steam. This could further lead, by too low cooling level, in a complete failure of the cooling system. Check coolant level in expansion tank (1) as per daily checks (see section 10.3.1 Operators Manual) or equivalent electronic warning system.
  - If EVANS NPG+ coolant is not locally available, temporarily top off the system with propylene glycol antifreeze and be sure not to add water. Within 15 days the temporary coolant should be completely drained and the system refilled with EVANS NPG+ coolant.
- ◆ CAUTION: The above mentioned warning instructions are excerpts of the manufacturer published Instruction Manual, in any case the original text in the Instruction Manual is authoritative.

**Datum der Bekanntgabe: 23.12.2004**

<p><b>Muster: Rotax</b> 912 912F 912s 914F</p>	<p><b>AD der ausländischen Behörde:</b> ACG AD A-2004-004R1 vom 22.12.2004</p>
<p><b>Geräte-Nr.:</b> 4585, 4592, 4618</p>	<p><b>Technische Mitteilungen des Herstellers:</b> Bombardier Rotax Service Bulletin SB-912-043 Bombardier Rotax Service Bulletin SB-914-029</p>

**Betroffenes Luftfahrtgerät:**

Rotax  
912, 912F, 912S, 914F

- Baureihen: 912 A Serie  
912 F Serie  
912 S Serie  
914 F Serie
- Werk-Nrn.: alle

**Betrifft:**

Austausch der Kühlflüssigkeit / Herabsetzung der maximal zulässigen Zylinderkopftemperaturen

**Maßnahmen:**

Detaillierte Informationen über die durchzuführenden Maßnahmen sind der oben genannten AD der ausländischen Behörde und der oben genannten Technischen Mitteilung des Herstellers zu entnehmen.

**Fristen:**

Alle anzuwendenden Fristen sind der o.g. AD der ausländischen Behörde zu entnehmen.  
Die Laufzeit aller anzuwendenden Fristen beginnt mit dem Datum der Inkraftsetzung der o. g. AD der ausländischen Behörde.

**Hinweis:**


Seit dem 28.09.2003 ist die Verordnung (EG) Nr. 1702/2003 der Europäischen Union in Kraft.  
Demnach sind gemäß Artikel 2 dieser Verordnung Lufttüchtigkeitsanweisungen des Entwicklungsstaates für ausländische Lfz-Muster unmittelbar gültig. Solange die Europäische Agentur für Flugsicherheit (EASA) noch kein eigenes Veröffentlichungsverfahren für Lufttüchtigkeitsanweisungen bekanntgegeben hat, werden solche ausländischen Lufttüchtigkeitsanweisungen ohne inhaltliche Änderungen per "Deckblatt-LTA" durch das Luftfahrt-Bundesamt angeordnet.

Durch die vorgenannten Mängel ist die Lufttüchtigkeit des Luftfahrtgerätes derart beeinträchtigt, daß es nach Ablauf der genannten Fristen nur in Betrieb genommen werden darf, wenn die angeordneten Maßnahmen ordnungsgemäß durchgeführt worden sind. Im Interesse der Sicherheit des Luftverkehrs, das in diesem Fall das Interesse des Adressaten am Aufschub der angeordneten Maßnahmen überwiegt, ist es erforderlich, die sofortige Vollziehung dieser LTA anzuordnen.

**Rechtsbehelfsbelehrung:**

Gegen diese Verfügung kann innerhalb eines Monats nach Bekanntgabe Widerspruch eingelegt werden. Der Widerspruch ist schriftlich oder zur Niederschrift beim Luftfahrt-Bundesamt, Hermann-Blenk-Str. 26, 38108 Braunschweig einzulegen.

LTA's werden auch im Internet unter <http://www.lba.de> publiziert

 <b>Abt. Flugtechnik</b>	Airworthiness Directive No. A-2004-004R1	Reference: FL206-1/132-04	
	<b>Rotax 912 A Series engines</b> <b>Rotax 912 F Series engines</b> <b>Rotax 912 S Series engines</b> <b>Rotax 914 F Series engines</b>	Registration mark: without	
		Page: 1	Sheet: 3

**This Airworthiness Directive is published by ACG as Primary Airworthiness Authority for the affected product on behalf of EASA.**

1. Applicability:       Rotax 912 A Series engines  
                               Rotax 912 F Series engines  
                               Rotax 912 S Series engines  
                               Rotax 914 F Series engines

installed in, but not limited to, certificated products of following manufacturers:

Aero Ltd., Aeromot, Alpi, Aquila, Diamond Aircraft Austria, Diamond Aircraft Canada, Issoire Aviation, Sauper, Scheibe, Sky Arrow, Stemme, Tecnam, WD Flugzeug, and installed in various aircrafts by Supplemental Type Certificates (STC).

This list is not exhaustive.

2. Subject:               Replacement of coolant/Reduction of Cylinder Head Temperature Limits

3. Reason:               Under certain powerplant installation and operating conditions boiling of conventional glycol/water coolant can occur before reaching maximum permissible cylinder head temperatures (CHT). This can lead to loss of coolant and subsequent engine overheat.


4. Action:               To insure safe operation corrective actions have to be performed on aircrafts with affected engines installed within the compliance time stated below.  
 Corrective Actions have to contain at minimum actions a) and c) or b) and c). Effects of these measures on the powerplant installation and on compliance with aircraft related requirements (e.g. engine cooling, engine operating limitations, a.s.o.) have to be reviewed by the affected aircraft manufacturers in accordance with aircraft related certification requirements before these measures are being introduced. Therefore affected aircraft manufacturers have to bindingly define if actions, and which actions have to be taken in addition and at the same time to the below listed engine related measures (e.g. alteration of indicator markings, airplane flight manual revisions, a.s.o.).

- a) Use of "EVANS NPG+" coolant

Glycol/water coolants of any mixing ratio have to be replaced with the waterless coolant EVANS NPG+ (specification in accordance with Rotax SB912-043/914-029, chapter 2, Material Information) in accordance with Rotax SB912-043/914-029, chapter 3.2, Changing the Coolant, and chapter 4, Appendix.

The max. CHT limits of 150°C for the Rotax 912 A/F series engines and 135°C for the Rotax 912 S series and 914 F series engines remain unchanged.



 <p><b>Abt. Flugtechnik</b></p>	Airworthiness Directive No. A-2004-004RI	Reference: FL206-1 /132-04	
	Rotax 912 A Series engines Rotax 912 F Series engines Rotax 912 S Series engines Rotax 914 F Series engines	Registration mark: without	
		Page: 2	Sheet: 3

b) Use of conventional glycol/water coolant (mixing ratio 50/50)

Following measures have to be taken if the glycol/water coolant (mixing ratio 50/50) shall remain in use:


- i) The open-up pressure of the coolant pressure vessel cap has to be checked. The open-up pressure is marked on the cap.
- ii) If a different open-up pressure than "1,2 bar" is marked on the cap, than the cap has to be replaced by a new pressure vessel cap, Rotax P/N 922.070.
- iii) Max. CHT limits have to be reduced to following values:  

Rotax 912 A/F/S series:	max. 120°C
Rotax 914 F series:	max. 120°C

c) Following changes to the installation and operating manuals have to be considered:

- i) Operator's Manuals Rotax 912 A/F series  
Chapter 10, operating limits  
CHT  
Use of EVANS NPG+ ..... max. 150°C  
Use of glycol/water- ..... max. 120°C  
coolant (50/50) and use of a 1.2 bar pressure vessel cap
  
- ii) Operator's Manuals Rotax 912 S series und 914 F series  
Chapter 10, operating limits  
CHT  
Use of EVANS NPG+ ..... max. 135°C  
Use of glycol/water- ..... max. 120°C  
coolant (50/50), and use of a 1,2 bar pressure vessel cap
  
- iii) Installation Manual Rotax 912 A series  
Chapter 7.1, operating limits  
CHT  
Use of EVANS NPG+ ..... max. 150°C  
Use of glycol/water- ..... max. 120°C  
coolant (50/50), and use of a 1,2 bar pressure vessel cap

LIE/KEL	December 22, 2004	
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	Airworthiness Directive No. A-2004-004RI		Reference: FL206-1/132-04	
	Rotax 912 A Series engines Rotax 912 F Series engines Rotax 912 S Series engines Rotax 914 F Series engines		Registration mark: without	
		Page: 3	Sheet: 3	

- iv) Installation Manual Rotax 912 F series  
 Chapter 6.1, operating limits  
 CHT  
 Use of EVANS NPG+ .....max. 150°C  
 Use of glycol/water- .....max. 120°C  
 coolant (50/50), and use of a 1,2 bar pressure vessel cap
  
- v) Installation Manual Rotax 912 S series  
 Chapter 7.1, operating limits  
 CHT  
 Use of EVANS NPG+ .....max. 135°C  
 Use of glycol/water- .....max. 120°C  
 coolant (50/50), and use of a 1,2 bar pressure vessel cap
  
- vi) Installation Manual Rotax 914 F series  
 Chapter 8.1, operating limits  
 CHT  
 Use of EVANS NPG+ .....max. 135°C  
 Use of glycol/water- .....max. 120°C  
 coolant (50/50), and use of a 1.2 bar pressure vessel cap

Further investigations are ongoing to re-establish the original CHT limits as far as possible. If positive results are attained this airworthiness directive will be revised accordingly.

5. Compliance: Latest December 31, 2005

6. Accomplishment: The required actions have to be accomplished either by the manufacturer, or a licensed/qualified person/organization, depending on national regulations. Accomplishment of the AD has to be confirmed in the aircraft log according to national regulations.

7. Effective Date: Immediately after receipt, replaces AD A-2004-004

EASA-Approval:  
 This AD is approved under reference EASA No 2004-12534 dated December 22, 2004.

LIE/KEL	December 22, 2004	
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