SPECIAL AIRWORTHINESS INFORMATION BULLETIN

Aircraft Certification Service
Washington, DC

U.S. Department of Transportation

Federal Aviation Administration

NE-05-84
August 30, 2005

http://www.faa.gov/aircraft/safety/alerts/SAIB

This is information only. Recommendations aren't mandatory.

CORRECTION: August 31, 2005, we have corrected typos in 2 paragraphs of the Background section, and attached the applicable service bulletins. All other information is correct.

Introduction

This Special Airworthiness Information Bulletin alerts you, owners and operators of **Bombardier-Rotax 912 A, 912 F, 912 S, and 914F series reciprocating engines**, to the correct type of coolant to use in your engine. If you use the incorrect type of coolant, cylinder head temperatures above 120°C can result in loss of coolant and engine overheating. These engines are installed on, but not limited to:

Manufacturer	Model
Aeromot-Industria Mecanico Metalurgica	AMT-200, AMT-200S, AMT-300
Aquila Technische Entwicklungen GmbH	AT01
Diamond Aircraft Industries (Canada and Germany)	DA20-A1, HK36 TS, HK36 TC, HK36 TTC, HK36 TTC-ECO, HK36 TTS
Iniziative Industriali Italiane	650 TC, 650 TCN, 650 TCS, 650 TCNS
Stemme GmbH	S10-VT

Background

Austro Control, the Austrian airworthiness authority, has advised us of new requirements regarding the type of coolant used in Rotax 912 A, 912 F, 912 S, and 914F Series reciprocating engines. The new coolant requirements apply to these engines if the maximum cylinder head temperature will exceed 120°C during normal operation.

If you use a conventional glycol/water coolant at cylinder head temperatures above 120°C, loss of coolant and engine overheating can occur. These new coolant requirements may not apply to all of these engines because the aircraft installation and operating conditions can affect the cylinder head temperature. The maximum cylinder head temperature limits for these engines remain the same.

Austro Control has published Airworthiness Directive (AD) A-2004-004R1 (attached), as a result of these findings. That AD requires the use of a specific waterless type of coolant if the maximum cylinder head temperature will exceed 120°C during normal operation. That AD also specifies requirements associated with the use of conventional glycol/water coolant if the maximum cylinder head temperature will not exceed 120°C during normal operation. It also provides information about related engine installation and operation manual changes.

Bombardier-Rotax has issued revisions to the installation manuals and operator's manuals that pertain to engine coolant requirements. Bombardier-Rotax has also issued service bulletins Nos. SB-912-043 and SB-914-029 (also attached), which provide recommendations for the use of a waterless coolant in the 912 series and 914 series engines.

Recommendation

We recommend that you comply with the engine coolant requirements specified in Austro Control AD No. A-2004-004R1, and that you comply with the related information contained in the applicable Bombardier-Rotax installation and operator's manuals and service bulletins.

For Further Information Contact

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Bombardier-Rotax, Gunskirchen, Austria; phone: (43) 7246-601-423; fax: (43) 7246-601-760; www.rotax-aircraft-engines.com.

austro CONTROL Abt. Flugtechnik	Airworthiness Directive No. A-2004-004R1	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: 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.

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

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.

ROTAX.
AIRCRAFT ENGINES

SERVICE BULLETIN

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

SB-912-043
SB-914-029

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
- 912 S all
- 914 F 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-914-025 "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

d03409

1.9) Electrical load data

No change

1.10) Software accomplishment summary

No change

1.11) References

In addition to this technical information refer to current issue of

- Operator's 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 andSouth America, Australia, Asia and Canada:

Evans Cooling Systems Inc. Sales and Warehous Office
PO BOx 434
Parkerford, PA 19457-0434, USA
Tel.: 001 610 323 3114
Fax: 001 610 970 0286
email: customerservice@evanscooling.com
Contact Cathy or Dave

Europe, the Middle East and Africa:

RENOX S.n.c.
Via Bologna, 12
60019 Senigallia AN, Italy
Tel.: +39 071 792 7942
Fax: +39 071 791 0343
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 7486 1970/1862
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.

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®-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 cperation. 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

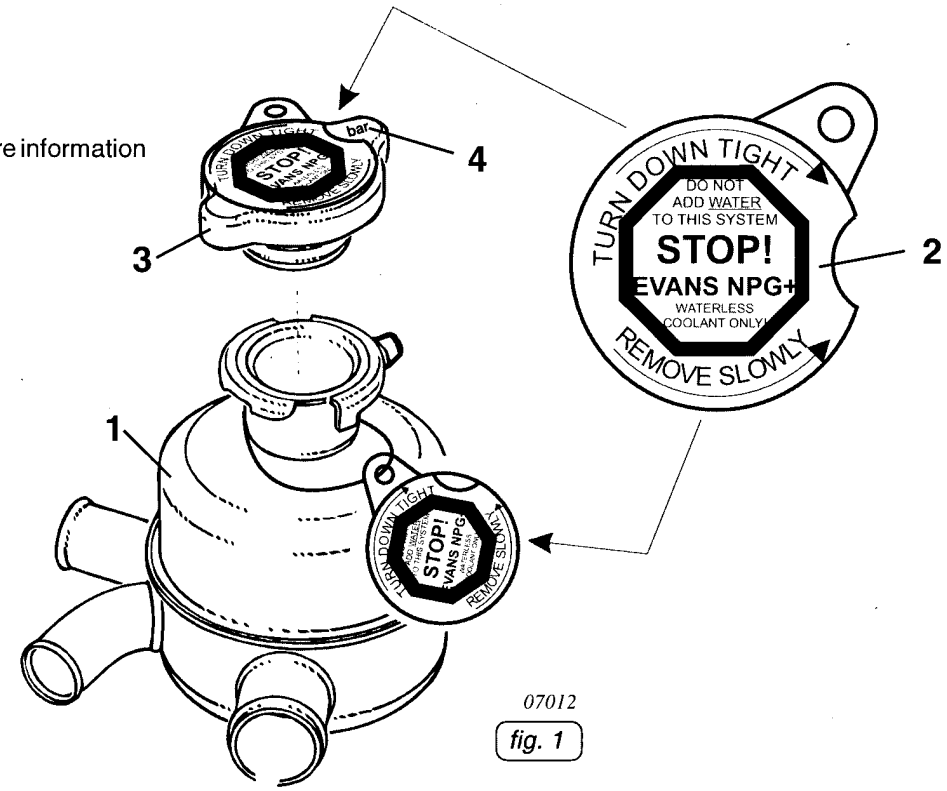

fig. 1

◆ 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 pluged.

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.