



# AIRWORTHINESS BULLETIN

Airbus Eurocopter AS 350 and AS 355  
Teflon/Stainless Steel Hydraulic Flight Control  
Hose Failures

**AWB** 29-004 **Issue** : 3  
**Date** : 17 September 2014

## 1. Effectivity

All Airbus Eurocopter AS350 and AS355 helicopters incorporating MOD 074239 which introduced Teflon/Stainless Steel hydraulic flight control hoses, as detailed by helicopter model and part number applicability per Eurocopter Information Notice 2506-I-29 Issue 2. (Figure 1 Applicability by Model)

AIRCRAFT CONCERNED	Version(s)	
	Civil	Military
AS350	B, BA, BB, B1, B2, B3, D	L1
AS550		A2, C2, C3, U2
AS355	E, F, F1, F2, N, NP	
AS555		UN, AN, SN, UF, AF

Figure 1

## 2. Purpose

Alert operators, pilots and maintenance personnel regarding failures in new Teflon/stainless steel braided hydraulic hoses introduced by MOD 074239.

## 3. Background

CASA has received a number of defect reports describing the failure of new Eurocopter (now Airbus Eurocopter) Teflon/stainless steel braided flight control hydraulic hoses. In one case a newly installed Teflon/stainless steel hose developed an undetected in-flight leak rate which was high enough to deplete the hydraulic reservoir from "MAX" to "MIN" in a single ferry flight lasting approximately 3.0 flight hours.

A single flight control system typically requires six hydraulic hoses. Had more than one Teflon/stainless steel pressure hose failed during the above flight, it is very likely that the hydraulic reservoir would have been more rapidly depleted and resulted in an unanticipated reversion to manual flight control requiring an immediate forced landing.

The basis for such concern is supported by a report of multiple pressure hose failures which occurred in close succession on the same aircraft. The Part and Batch numbers of the failed hoses are as follows:

- Tail Servo Pressure Hose - P/N 704A344 -122-51, Batch Numbers F8694, OF20920, 1T13
- Main Rotor Servo Pressure Hose (2 failed) - P/N 704A344 - 122-53A, Batch Numbers F8694, OF21066, 4T12



Airbus Eurocopter AS 350 and AS 355  
Teflon/Stainless Steel Hydraulic Flight Control  
Hose Failures

**AWB** 29-004 **Issue** : 3  
**Date** : 17 September 2014

- Main Rotor Servo Pressure Hose - P/N 704A344 -122 - 54A, Batch Numbers F8694, OF21084, 4T12
- Main Rotor Servo Pressure Hose - Another operator reports that a shipment of brand new Airbus Eurocopter hoses P/N 704A34412251 and P/N 704A34412271 were pressure tested prior to installation to determine serviceability. A total of four hoses from two different batch numbers developed numerous pin-hole leaks along their length under testing and were subsequently rejected.

The additional hazard of fire in the air due to the combination of the presence of undetected hydraulic oil in the main rotor gearbox compartment and sparking/arcing between unsleeved hoses and an unprotected cooling fan or other circuits cannot be ignored. The particular circumstances that resulted in fire in the air is described in *EASA AD 2011-0033 AS350 'Forward Hydraulic Servo Control Hoses'*. This AD requires the installation of fire sleeving on two (polyamide) hydraulic flight control hoses because:

*"An in-flight fire in the main gearbox compartment occurred on an AS350B2 helicopter. The fire was caused by ignition of hydraulic fluid leaking from a hydraulic hose, which had been damaged following an electrical fault in a circuit located in the compartment that is not fire protected. An in-flight fire in the main gearbox compartment during a continued flight, when undetected or if a landing could not be performed immediately, can result in loss of hydraulics, possible shut down of the engine because of fire effects and damage to the Main Rotor (MR) control system. This condition, if not prevented, could lead to loss of MR control, potential power loss, structural damage and propagation of fire into the cabin or other compartments, consequently with loss of control of the helicopter and possible injury of the occupants. For the reasons described above, this AD requires installation of protection sleeves on hydraulic hoses as a final solution".*

The Eurocopter Information Notice 2506-I-29 Issue 2 advises that the Teflon/stainless steel hydraulic hoses began leaking immediately following their introduction. The Eurocopter investigation found that the Teflon lining in these hoses can charge with static electricity via a tribo-electrical phenomenon (friction between the Teflon and the hydraulic oil flowing through it), creating a significant electrical potential which discharges into the stainless steel braid when the potential has reached the Teflon tube's insulating limit. This discharge (arcing) can create a "micro perforation" of the hose and cause leaks. Below see Eurocopter Information Notice 2506-I-29. Issue 2, Figure 2 Applicability by Part Number.



# AIRWORTHINESS BULLETIN

Airbus Eurocopter AS 350 and AS 355  
Teflon/Stainless Steel Hydraulic Flight Control  
Hose Failures

**AWB** 29-004 **Issue** : 3  
**Date** : 17 September 2014

	P/N PRE MOD 074239	P/N POST MOD 074239	P/N POST MOD 074686
Ground Brake Unit (BFS) pressure → Tail servo-control	704A34-412-020	704A344-122-51	704A344-122-72
Tail servo-control Pressure → Accu.	704A34-412-046	704A344-122-60	704A344-122-40
LH & Front Servo-control Pressure	704A34-412-033	704A344-122-53	704A344-122-41
RH Servo-control Pressure	704A34-412-034	704A344-122-54	704A344-122-41
Regulation Pressure	704A34-412-037	704A344-122-71	704A344-122-42
Pump Pressure	704A34-412-038	704A344-122-57	704A344-122-35

Failing Teflon /stainless steel hoses have now been discovered in a newly manufactured AS350 helicopter. Airbus Eurocopter are unable to determine if any newly manufactured Teflon/stainless steel flight control hoses identified in Eurocopter Information Notice 2506-I-29 Issue 2 will be airworthy.

Airbus Eurocopter are currently supplying the failing Teflon /stainless steel hoses identified in Eurocopter Information Notice 2506-I-29 Issue 2 as replacements for hoses of the same part number which have failed in service.

#### 4. Recommendations

CASA recommends that Operators:

- (1) Do not hold as spares or install the Airbus Eurocopter Teflon/stainless steel hoses identified in Eurocopter Information Notice 2506-I-29. Issue 2 (MOD 074239); and
- (2) Ensure all pilots and maintenance personnel closely monitor installed Teflon/stainless steel hoses identified in Eurocopter Information Notice 2506-I-29. Issue 2 (MOD 074239) for leaks; and
- (3) Plan to remove the Airbus Eurocopter Teflon/stainless steel hoses identified in Eurocopter Information Notice 2506-I-29. Issue 2 (MOD 074239) from service, and
- (4) Install POST MOD 074686 hoses at your earliest convenience.



# AIRWORTHINESS BULLETIN

Airbus Eurocopter AS 350 and AS 355  
Teflon/Stainless Steel Hydraulic Flight Control  
Hose Failures

**AWB** 29-004 **Issue** : 3  
**Date** : 17 September 2014

## 5. Reporting

All reports of leaking AS350 Series flight control hoses identified in Eurocopter Information Notice 2506-I-29 Issue 2 should be reported to CASA via the SDR system, or email to [SDR@casa.gov.au](mailto:SDR@casa.gov.au) and to Airbus Eurocopter via: [Hydraulics.Technical-Support@eurocopter.com](mailto:Hydraulics.Technical-Support@eurocopter.com)

[AirworthinessBulletin@casa.gov.au](mailto:AirworthinessBulletin@casa.gov.au)

or in writing, to:

Airworthiness and Engineering Standards Branch  
Standards Division  
Civil Aviation Safety Authority  
GPO Box 2005, Canberra, ACT, 2601