Supplement No. AFS-BH206L3L4-IBF-KIT-FMS

Donaldson
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FAA APPROVED
ROTORCRAFT FLIGHT MANUAL SUPPLEMENT
TO THE

BELL HELICOPTER TEXTRON CANADA (BHTC) LIMITED
BELL MODEL 206L-1, 206L-3 & 206L-4
ROTORCRAFT FLIGHT MANUALS

FOR THE
INLET BARRIER FILTER SYSTEM
INSTALLATION

Aircraft S/N _____ Aircraft Reg. No. _____

This supplement must be attached to applicable FAA Approved Rotorcraft Flight Manual, when the rotorcraft is modified by the installation of the AFS Inlet Barrier Filter (IBF) System in accordance with STC No. SR09421RC

The information contained herein supplements or supersedes the basic manual only in those areas listed herein. For limitations, procedures, and performance information not contained in this supplement, consult the basic Rotorcraft Flight Manual.

FAA Approved

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LOG OF REVISIONS

Revision No.	Revision Description	Pages Effected	FAA Approved:	Date:
IR	Initial Release	ALL	Carl F. Mittag	08-25-04
A	Replaced "Log of Pages" with "Log of Revisions". Revised Section 4 (performance) to modify PAC procedures to allow use of "Purge Off" charts	1, 7	Superseded By Rev. B	A
B	Added 206L-1* to applicability Added data to Section 1 Removed paragraph numbers from Section 2 Added chart requirement to Section 4 Removed Weight & Balance (Section 5) Removed Appendix A Renumbered Pages	2-6, 10, 11 Deleted Sections 5 & Appendix A	Carl F. Mittag	09-22-05
C	Added 206L1 aircraft with engine upgrade IAW BHT-206-SI-2050	1, 4, 10	Lance Gant	Nov 04 2008
D	Added the allowance of Operations With Improved Hover Performance with the IBF installed and Compliance with FMS BHT-407-FMS-8, Added Improved Hover Performance STC Configuration, Updated FMS to latest Format, Changed Logo	ALL	Joe Miess	7 May 2013
E	Administrative corrections only, (removed 407 references and replaced with 206L-1, 206L-3, & 206L-4 in header of this document)	ALL	Steven Lardinois	18 Oct 2013

NOTE
Revised text from previous revision is indicated by a black vertical line in the right border

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GENERAL INFORMATION

It is responsibility of the flight crew to be familiar with the contents of this Flight Manual Supplement (FMS) including all revisions and any temporary revision which is applicable at the time of flight.

TERMINOLOGY

WARNINGS, CAUTIONS AND NOTES

Warnings, Cautions and Notes are used throughout this manual to emphasize important and critical instructions and are used as follows:

WARNING

An operating procedure, practice, etc., which, if not correctly followed, could result in personal injury or loss of life.

CAUTION

An operating procedure, practice, etc., which, if not strictly observed, could result in damage to, or destruction of, equipment.

NOTE

An operating procedure, condition, etc., which is essential to highlight.

USE OF PROCEDURAL WORDS

The concept of procedural word usage and intended meaning which has been adhered to in preparing this RFM is as follows:

"**Shall**" or "**Must**" are used to indicate a mandatory requirement.

"**Should**" is used to indicate a non-mandatory but preferred method of accomplishment.

"**May**" is used to indicate an acceptable method of accomplishment.

ABBREVIATIONS

AFS – Aerospace Filtration Systems, Inc.
EAPS – Engine Air Particle Separator
FAA – Federal Aviation Administration
FMS – Flight Manual Supplement
FOD – Foreign Object Damage
IBF – Inlet Barrier Filter
IVF – Inducer Vent Filter
ICA – Instructions for Continued Airworthiness
IMC – Instrument Meteorological Conditions
NG – Gas Producer RPM
OEM – Original Equipment Manufacturer
PAC – Power Assurance Check
RFM – Rotorcraft Flight Manual
STC – Supplemental Type Certificate
TOT – Turbine Outlet Temperature

SYSTEM DESCRIPTION

The IBF STC kit (106000-105) consists of the basic IBF system and a quick “access door” for filter servicing without cowl removal. The IBF system includes a removable barrier filter assembly, integral seals, mounting adapter frame, differential pressure switch, filter maintenance aid, inlet plenum floor with bypass door / actuator assembly, two floor closeout angles, a cockpit dual indicator / actuator switch, an engine wash nozzle / supply tube assembly, and all unique installation hardware and wiring. The quick “access door” modification includes the door, seals, and all necessary structural components.

Installation of the IBF STC requires that the engine bleed air or scavenge air used by the engine air Particle Separator (if installed), be capped; the particle separator purge air toggle switch, labeled “PARTICLE SEP PRG” (if installed), be removed; and the 5 amp breaker be replaced by a 3 amp breaker.

Operation of the aircraft with the IBF system installed requires use of the same performance information and/or charts as required in Rotorcraft Flight Manual (RFM) or the following supplements as required: Supplement ASI-206L-C30P-FMS-3, Supplement BHT-206L3-FMS-3, or Supplement BHT-206L4-FMS-3 (as applicable) for the Bell engine air particle separator kits for operations as defined in Section 4 of this supplement or Supplement BHT-206L4-FMS-11 for Improved Hover Performance with Assured Power.

HELICOPTER APPLICABILITY

1- Bell 206L-1 aircraft that have been modified IAW STC SH296NM, ASI installation of C30 engine or have Bell engine upgrade kit 206-706-520 installed per the BHT-206-SI-2050.

2- Bell 206L-3 and 206L4 Helicopters

3- Bell 206L1+ and 206L3+ Helicopters (Increased Gross Weight Upgrade Kit 206-706-530 installed per BHT-206-SI-2052)

4- Bell 206L-4 Helicopters with Improved Hover Performance With Assured Power (Bell STC No. SR09538RC-D Installed)

Section 1

LIMITATIONS

TYPE OF OPERATION

The installation of the IBF system does not change the existing operational restrictions listed in the basic Rotorcraft Flight Manual (RFM) or existing flight manual supplements. Refer to the Limitations and/or Performance Sections of the RFM and/or supplements for Types of Operation.

Snow Deflector Kit (206-706-208) shall be installed in conjunction with the IBF system when conducting operations in falling and/or blowing snow.

NOTE

Although the IBF system does not require the use of purge air, use of this supplement requires that a current copy of Air Services International Particle Separator RFMS ASI-206L-C30P-FMS-3, Bell 206L3 Particle Separator RFMS BHT-206L3-FMS-3 or Bell 206L4 Particle Separator RFMS BHT-206L4-FMS-3, as applicable, be inserted in the flight manual at all times.

NOTE

For each of the supplements listed above, use the PARTICLE SEPARATOR "PURGE OFF" charts located in the applicable PERFORMANCE section of each of the appropriate Flight Manual Supplements.

NOTE
(Bell 206L-1+, 206L-3+, or 206L-4 Only)

If the Improved Hover Performance with Assured Power (STC No. SR09538RC-D) is to be utilized, the applicable FMS (BHT-206L4-FMS-11) must be carried in the aircraft at all times.

OPTIONAL EQUIPMENT

NOTE

The operator shall verify the performance of the aircraft due to other/optional equipment that may be installed.

This supplement requires performance information for various combinations of Bell kits. It also may require limitations and operating procedures made necessary because of kit combinations. Refer to PERFORMANCE section in the appropriate Flight Manual Supplement. This supplement is not intended to replace approved supplements for other optional equipment, but should be used in conjunction with such supplements.

NOTE
(For Helicopters Not Utilizing "Improved Hover Performance with Assured Power" (Power Plus)

During flight operations with the engine air inlet snow deflector kit installed, see notes in Section 2 of this supplement relating to use of the IBF Filter Maintenance Aid, and in Section 3 of this supplement relating to intermittent FILTER light indications.

the pressure differential across the engine inlet filter is above a preset value.

INSTRUMENT MARKINGS AND PLACARDS



An “IBF” placard (as shown above) is located near the IBF 3-amp circuit breaker in the circuit breaker panel and near the IBF cockpit indicator/switch.

NOTE

“IBF” may be engraved or silk-screened in lieu of the placards



(The Figure above has both indicator segments illuminated for illustration purposes only)

The indicator/switch includes a push-button switch used to open/close the filter bypass and two indicator segments used to alert the pilot any time the filter is restricted or the bypass door is open.



The upper segment of the indicator is labeled “FILTER” and will illuminate yellow/amber when



The lower segment of the indicator is labeled “BYPASS” and will illuminate yellow/amber whenever the bypass door is in the full open position.

NOTE:

“FILTER” segment should extinguish when “BYPASS” segment illuminates indicating differential pressure is again within normal operating range.

Section 2

NORMAL PROCEDURES

PRE-FLIGHT CHECK

WARNING

Failure to remove the environmental protective cover/plugs could result in a failure of the engine to start or could result in a hot start

1. Remove the environmental protective cover/plugs, if installed.

FUSELAGE – CENTER RIGHT SIDE

1. Check IBF Filter Maintenance Aid to determine condition of the filter. When indicator enters RED zone (See Figure 2-1 of this FMS), service filter per IBF Instructions for Continued Airworthiness, AFS-206L3L4-IBF-KIT-ICA.

   NOTE

   During flight operations with the engine air inlet snow deflector kit installed, the Filter Maintenance Aid (FMA) will not provide accurate readings and therefore should not be used as an indicator of the filter condition. Upon removal of the snow doors, reset the FMA prior to next flight.

2. Perform a visual check that the bypass door is in the closed position.

BEFORE FLIGHT WHEN OPERATING IN SNOW CONDITIONS

1. Thoroughly check the cabin roof, transmission cowling, deflector baffles and engine air intake areas. All areas checked shall be clean and free of accumulated snow, slush, and ice before each flight.

2. Check engine air plenum chamber through plexiglass windows on each side of inlet cowling for snow, slush, or ice, paying particular attention to the firewall, the rear face of Inlet Barrier Filter assembly, and the IBF bypass door and surrounding floor area. Ensure all are thoroughly clear of snow, slush, or ice before each flight.

POST-FLIGHT CHECK

1. Check the IBF Filter Maintenance Aid to determine condition of the filter. If the indicator is near or in the RED zone contact maintenance for filter servicing.

2. Install the environmental protective cover/ plugs, if available.

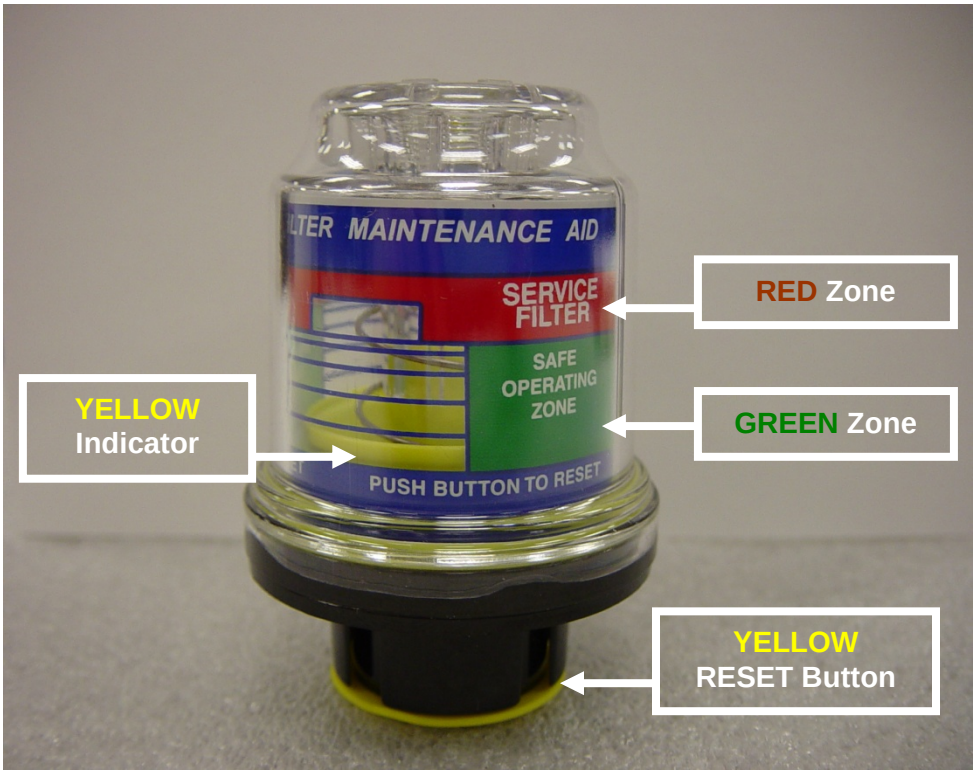

Figure 2-1. FILTER MAINTENANCE AID – (ABOVE) "YELLOW Indicator" position relative to SAFE OPERATING ZONE ("GREEN Zone") or SERVICE FILTER ("RED Zone") markings defines current filter condition and pushing "YELLOW RESET Button" resets indicator. (BELOW) FMA unit is mounted to bottom of IBF floor assembly and is accessed through RH access door on air inlet cowl assembly.



Section 3

EMERGENCY/MALFUNCTION PROCEDURES

Caution Lights (YELLOW/AMBER)

Panel wording	Fault condition	Corrective action
	Illumination of the "FILTER" segment of the cockpit indicator / switch indicates the pressure differential preset value for engine has been reached or exceeded. NOTE As the filter becomes more contaminated, certain flight conditions may cause "FILTER" segment to flicker intermittently. Corrective action should be taken only when the "FILTER" segment illumination is continuous.	Monitor TOT for any significant rise, i.e. > 20°C. Monitor engine conditions for any indications of engine degradation or compressor stall, i.e. TOT fluctuations, and decreasing or fluctuating N1 rpm. If rise in TOT or engine performance is unacceptable: ▪ Open affected bypass door by pressing illuminated "FILTER" indicator/switch. ▪ "BYPASS" segment of indicator/switch should illuminate and the "FILTER" segment of indicator/switch should extinguish indicating the bypass door is open and the pressure differential is back within the normal range. Service filters prior to next flight. NOTE If the "FILTER" light illuminate during take-off, recommend servicing the filter before continuing flight. CAUTION TO PREVENT COMPRESSOR EROSION AVOID (IF POSSIBLE) OPERATION IN DIRTY OR DUSTY ENVIRONMENT WITH THE BYPASS DOOR OPEN.
	Illumination of the "BYPASS" segment of the cockpit indicator / switch indicates the bypass door is open and the filter is being bypassed and is allowing unfiltered air to enter the engine.	If the flight or landing environment has significant dirt or debris, it is recommended that the bypass door be closed, provided no rotorcraft or engine limits will be exceeded. With the bypass closed, the "BYPASS' segment will extinguish and the "FILTER" segment will potentially re-appear under high engine power settings until the filter has been cleaned.

ENVIRONMENTAL CONDITIONS

Fault / condition	Corrective Action
Inadvertent encounters with icing conditions	Exit condition as soon as practical.

ELECTRICAL

Fault / condition	Corrective Action
Tripped Circuit Breaker	Monitor TOT for any significant rise, i.e. > 20°C. Monitor engine conditions for any indications of engine degradation or compressor stall, i.e. TOT fluctuations, and decreasing or fluctuating N1 rpm. ▪ Contact maintenance after landing If rise in TOT or engine performance is unacceptable, i.e. approaching engine limits: ▪ Land as soon as practicable

Section 4

PERFORMANCE

OPERATIONS WITH STANDARD BELL 206L-1, 206L-3, OR 206L-4 CONFIGURATIONS

FOR ALL 206L-1, 206L-3, AND 206L-4 AIRCRAFT USING BASIC INLET OR EAPS PERFORMANCE CHARTS

To determine the minimum torque available when the IBF is installed, refer to the PAC procedures and charts in the applicable Rotorcraft Flight Manual (ASI-206L-1-FM, BHT-206L3-FM-1, or BHT -206L4-FM-1).

If the actual torque indicated (or in the case of the EAPS actual adjusted by 3%) is the same or greater than the required chart torque, engine performance equals or exceeds minimum specification, and the performance data in the appropriate RFM can be achieved.

If the actual torque indicated (or in the case of the EAPS actual adjusted by 3%) is less than the required chart torque, engine performance is less than the minimum specification, and the performance data in the appropriate RFM cannot be achieved. Refer to appropriate maintenance manual or contact maintenance to determine the cause of the low power.

BASIC INLET PERFORMANCE

When the Inlet Barrier Filter (IBF) system STC is installed, use the basic inlet Power Assurance Check (PAC) chart (hover or level flight) contained in the basic RFM (ASI-206L-1-FM, BHT-206L3-FM-1, or BHT -206L4-FM-1) to determine the minimum torque.

If the PAC is satisfactory (i.e. the actual torque is greater or equal to the minimum torque), then basic performance can be obtained and the applicable basic inlet performance data charts may be used.

If the basic PAC is not satisfactory (i.e. the actual torque is less than the minimum torque), then published performance may not be achieved. If this is the case, either clean the IBF filter and recheck the engine health using the basic inlet PAC chart or compare the recorded PAC values against the applicable Engine Air Particle Separator (EAPS) charts (ASI-206LI-C30P-FMS-3, BHT-206L3-FMS-3, or BHT-206L4-FMS-3).

ENGINE AIR PARTICLE SEPARATOR (EAPS) PERFORMANCE

NOTE

Bell 206L1* Operators - Operation of the Inlet Barrier Filter (IBF) system requires use of the latest approved revision “PARTICLE SEPARATOR PURGE OFF” performance charts from ASI-206L-C30P-FMS-3 or BHT-206L3-FMS-3 as applicable.

NOTE

Bell 206L3 Operators - Operation of the Inlet Barrier Filter (IBF) system requires use of the latest approved revision “PARTICLE SEPARATOR PURGE OFF” performance charts from BHT-206L3-FMS-3.

NOTE

Bell 206L4 Operators - Operation of the Inlet Barrier Filter (IBF) system requires use of the latest approved revision “PARTICLE SEPARATOR PURGE OFF” performance charts from BHT-206L4-FMS-3.

NOTE

If Snow Deflectors are installed use basic inlet with Snow Deflector PAC chart in supplements BHT-206L3-FMS-7 for 206L3

and 206L1 with Engine upgrade kit 206-706-520, BHT-206L4-FMS-7 for 206L-4, or ASI-206L-30P-FMS-7 for 206L1 with ASI STC SH296NM.

After the minimum torque has been derived from the applicable Rotorcraft Flight Manual (ASI-206L-1-FM, BHT-206L3-FM-1, or BHT - 206L4-FM-1), subtract a constant 3% torque. This will be the minimum torque available with the IBF installed.

EXAMPLE

Minimum TORQUE available 76% (as read from Power Assurance Check chart)

Subtract 3 PERCENT TORQUE -3% (due to Inlet Barrier Filter)

Minimum TORQUE available 76%-3% = 73%

If the PAC is satisfactory (i.e. the actual torque is greater or equal to the minimum torque), then EAPS performance can be obtained and the applicable EAPS performance data charts may be used.

If the basic PAC is not satisfactory (i.e. the actual torque is less than the minimum torque), then published performance may not be achieved. If this is the case, clean the IBF filter and recheck the engine health. If the PAC is then satisfactory, published EAPS performance can be obtained. If the PAC is still not satisfactory, refer to the appropriate maintenance manual or contact maintenance to determine the cause of the low power.

OPERATIONS FOR BELL 206L-4 HELICOPTERS WITH BELL STC NO. SR09538RC-D INSTALLED "IMPROVED HOVER PERFORMANCE WITH ASSURED POWER" (POWER PLUS), AND 206L1+ & 206L3+ HELICOPTERS WITH INCREASED GROSS WEIGHT UPGRADE KIT 206-706-530 INSTALLED PER BHT-206-SI-2052

NOTE

When operating with the Improved Hover Performance With Assured Power STC (Power Plus) installed, use of the procedures and data found in the FAA approved FMS, BHT-206L4-FMS-11 are applicable and all requirements, as

outlined in FMS, BHT-206L4-FMS-11 apply with the IBF installed and must be adhered to.

Use the "Plus Power" PAC chart to determine engine health with the average of the 10 most recent PAC events.

If the "Plus Power" PAC is satisfactory, then performance can be achieved using the appropriate performance charts in BHT-206L4-FMS-11.

If the "Plus Power" PAC is not satisfactory (i.e. "Plus Power" margin is 2.0% or more lower than the average of the last 10 PAC values), then "Plus Power" published performance may not be achieved. If this is the case, either clean the IBF filter and recheck the engine health again using the BHT-206L4-FMS-11 PAC chart, or follow the steps listed in the "BASIC INLET PERFORMANCE" or "ENGINE AIR PARTICLE SEPARATOR (EAPS) PERFORMANCE" of this Supplement.

NOTE

Use of performance charts presented in FMS BHT-206L4-FMS-11 is not authorized with Snow Deflector Kit (BHT-206L4-FMS-7) installed.

ALL CONFIGURATIONS

CAUTION

Helicopter performance is reduced as the IBF becomes contaminated with dirt, dust and debris. The pilot/operator is responsible to utilize the PAC procedure to determine if the engine can produce installed power.

If engine does not pass PAC, published performance cannot be achieved, contact maintenance for appropriate trouble shooting procedures as outlined in applicable

Instructions for Continued Airworthiness or Maintenance Manuals. Ensure that the IBF FILTER caution light is not illuminated during performance of the PAC.

Section 5

WEIGHT AND BALANCE

NO CHANGE