



# Federal Aviation Administration

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## Memorandum

Date: MAY 22 2015

To: John S. Duncan, Director, Flight Standards Service, AFS-1  
Dorenda D. Baker, Director, Aircraft Certification Service, AIR-1  
Mark Bury, Assistant Chief Counsel, AGC-200

From: Leisha Bell, Chair, Regulatory Consistency Communication Board

Subject: RCCB Decision: CH-47D Flight Check and Operating Issues

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### **Action Required**

Concur or non-concur with comment on the resolutions facilitated by the Regulatory Consistency Communication Board (RCCB).

This memo serves as documentation of the actions taken to address the issues described below. This memo is not a policy document. Refer to current guidance for decision-making support.

### **Summary**

Upon an operator's request for a practical test in a restricted category aircraft, Flight Standards Service (AFS) stakeholders identified three key questions relevant to the resolution of the issues raised by the request. These questions were:

1. Is an exemption required for certification and currency checks to be conducted in a restricted category aircraft under Title 14 Code of Federal Regulations (14 CFR) part 61?
2. What are the requirements for the third flight crewmember designated on the type certificate data sheet (TCDS) for the CH-47D?
3. Is the current type rating qualification standard for the CH-47D appropriate?

On February 6, 2015, John S. Duncan, Director, AFS-1, referred this issue to the RCCB to facilitate a resolution. This memo outlines the actions taken by Flight Standards Service (AFS) and the Aircraft Certification Service (AIR) as a direct result of the questions above.

### **Background**

Billings Flying Service, Inc. (BFS), of Billings, MT, holds 14 CFR parts 133, 135 and 137 certificates. To prepare to contract for forest fire suppression work with the Federal government, BFS requested a number of certification and recurrent flight checks from the Helena, MT, Flight

Standards District Office (FSDO). The Helena FSDO is the certificate holding district office for BFS.

On July 22, 2014, BFS was issued a type certificate (TC) approval for the CH-47D rotorcraft in the restricted category. The TC is applicable to ex-military CH-47Ds, as is another restricted category TC approval issued to Columbia Helicopters, Inc., (Columbia). Based on the “PILOT CERTIFICATE AIRCRAFT TYPE DESIGNATIONS – HELICOPTER” table in Order 8900.1, the CH-47D corresponds to the BV-234 (model 234), as does the CH-47A, B, and C. The model 234 TC is for a standard category aircraft and requires a minimum crew of pilot and copilot. The TCDSs for the restricted category CH-47D specified a minimum crew of pilot, copilot, and flight crewmember.

The qualifications required for the flight crewmember are not stated in the TCDS. “Flightcrew member” is defined in 14 CFR part 1 as “a pilot, flight engineer, or flight navigator assigned to duty in an aircraft during flight time.” “Crewmember” is defined in 14 CFR part 1 as “a person assigned to perform duty in an aircraft during flight time.” There is no flight engineer rating for helicopters under 14 CFR part 63.

In addition to questions about the required flight crewmember, personnel of the Rotorcraft Aircraft Evaluation Group (AEG) questioned whether the CH-47D should be included in the BV-234 type rating qualification standard.

Telecons were held on February 2 and 6, 2015, with AFS personnel to discuss these issues. Stakeholders represented included the Helena, MT and Portland, OR, FSDOs; the Northwest Mountain Flight Standards Division, ANM-200; the General Aviation and Commercial Division, AFS-800; and the Office of AFS-1. The issues could not be fully resolved on these calls and a decision was made to cancel the practical tests set to be administered the week of February 8.

On February 6, Ricardo Domingo, Manager, ANM-200, sent a memo to John S. Duncan, Director, AFS. The memo outlined the three key questions raised by AFS personnel that could not be resolved earlier.

AFS-1 asked that resolution of these issues be facilitated by the RCCB. Between February 9 and March 13, multiple conference calls were held involving stakeholders from AFS and AIR.

### **Actions Taken**

#### **Question 1: Exemption**

In a letter dated January 14, 2015, BFS petitioned the Federal Aviation Administration (FAA) for exemption from 14 CFR§ 91.313(a) and (b). AFS-800 and the Office of Chief Counsel determined that an exemption was needed to conduct a practical test in a restricted category aircraft. They also concurred that an exemption was appropriate to grant to BFS. The FAA granted BFS an exemption to 14 CFR § 91.313(a) and (c) in response to its petition. This allows BFS, subject to the conditions and limitations of the exemption, to operate a restricted category aircraft for the purposes of:

1. Practical tests necessary to issue a type rating required by 14 CFR § 61.31(a) to pilots employed by BFS;

2. Proficiency training for pilots employed by BFS seeking to take a practical test for a type rating designation; and,
3. Observation flights performed with an aviation safety inspector onboard for the purpose of designation or observing a designated pilot examiner.

The grant of exemption also clarified that proficiency checks required under 14 CFR § 61.58 do not require an exemption. Specifically, the grant of exemption states,

The FAA notes that its determination that restricted category aircraft cannot be used for practical test for type rating, does not apply to proficiency checks accomplished by those pilots that already hold the requisite type rating and whose duties are to perform an operation described in § 91.313(a). These flights, such as flights needed to satisfy the PIC proficiency checks required by § 61.58 (and associated PPE observation), are considered necessary to accomplish the work activity directly associated with the aircraft's special purpose and would not require regulatory exemption.

**Question 2: TCDS**

On February 18, 2015, the BFS CH-47D TCDS was revised and R0011DE Revision 2 was issued. In Revision 2, the minimum crew was changed from pilot, copilot, and flight crewmember to pilot, copilot, and crewmember. A note was added to the minimum crew section that states:

Non-Pilot crewmembers will be trained in accordance with the Billings Flying Service, Inc. Rotorcraft Flight Manual "CH-47D Helicopter", as amended; the Billings Flying Service, Inc. Functional Check Flight Manual for the Billings Flying Service, Inc CH-47D Helicopter, as amended; and the Billings Flying Service, Inc. Crewmember's Checklist as amended.

This change allows the third required crewmember to be someone other than a pilot.

AIR considered a similar change for the Columbia CH-47D TCDS. However, following discussions with the FAA about the proposed change for the minimum crew, Columbia explained their desire for the TCDS to remain unchanged. Due to this request, AIR and AFS agreed a change was not necessary for the Columbia TCDS. R00051SE revision 0 remains in effect. This TCDS requires a pilot, copilot, and a flight crewmember. The term "flight crewmember" when used in conjunction with a helicopter means the person must be a certificated pilot.

There are no other TCDSs for the CH-47D at this time.

**Question 3: Type Rating**

The AEG completed two reports to support the question raised in the February 6, 2015, memo regarding the type rating qualification standard. The "Commonality and Differences in Training Report – Columbia Model 234 and CH-47D Chinook", which provides a summary of differences between the model 234 and the CH-47D and the "Related Aircraft Differences Training and

Checking Table – Columbia Model 234 and CH-47D Chinook”, which provides a comparison for training and checking a crewmember when transitioning from a model 234 to a CH-47D.

These reports were issued after the AEG met with Columbia on February 19 and 20, 2015. Columbia operates both model 234 and CH-47D helicopters. The AEG reviewed actual aircraft equipment configurations, flight manuals, and training programs for each aircraft. Flight handling and performance characteristics were reported by pilots employed by Columbia.

AFS-800 is currently reviewing these reports against Advisory Circular (AC) 120-53B, Guidance for Conducting and Use of Flight Standardization Board Evaluations. This review is intended to help determine whether the current type rating qualification standard used for the model 234 is applicable to the CH-47D, is aligned with the AC, and whether a Flight Standardization Board (FSB), or other action, is required.

### **Ongoing Issues**

To support pilots that operate restricted category aircraft for a special purpose, the FAA is reviewing options that would minimize or alleviate the need to request an exemption to 14 CFR § 91.313 to complete pilot training or testing that leads to a type rating designation required by 14 CFR § 61.31.

AFS-800 will continue its review of the reports generated by the AEG on the model 234 and CH-47D. This review will determine if an FSB is required to establish a new type rating for CH-47D.

Addendums will be made to this memo once the ongoing issues are resolved.

5 Attachments

- Grant of Exemption to Billings Flying Service, Exemption No 11180
- Type Certificate Data Sheet, R0011DE, Revision 2
- Type Certificate Data Sheet, R00051SE, Revision 0
- Commonality and Differences in Training Report – Columbia Model 234 and CH-47D Chinook
- Related Aircraft Differences Training and Checking Table Columbia Model 234 and CH-47D Chinook

Concur: John Barballo Concur: Dorenda D Baker

Non-Concur: \_\_\_\_\_ Non-Concur: \_\_\_\_\_

Date: 4/29/2015 Date: 5/19/15

for John S. Duncan  
Director, Flight Standards Service

Dorenda D. Baker  
Director, Aircraft Certification Service,

Concur: [Signature]

Non-Concur: \_\_\_\_\_

Date: 5/22/2015

Mark Bury  
Assistant Chief Counsel

Exemption No. 11180

UNITED STATES OF AMERICA  
DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
WASHINGTON, DC 20591

In the matter of the petition of

**BILLINGS FLYING SERVICE**

for an exemption from  
§ 91.313(a) and (b)  
of Title 14, Code of  
Federal Regulations

**Regulatory Docket No. FAA-2015-0104**

**GRANT OF EXEMPTION**

By letter dated January 16, 2015 Mr. Jeff Cook, Billings Flying Service, 6309 Jellison Road, Billings, MT 59101 petitioned the Federal Aviation Administration (FAA) for an exemption from § 91.313(a) and (b) of Title 14, Code of Federal Regulations (14 CFR). The proposed exemption, if granted, would allow Billings Flying Service to conduct operations needed to satisfy training, type rating requirements, and proficiency requirements found in part 61 in restricted category aircraft.

**The petitioner requests relief from the following regulations:**

Section 91.313(a), which prescribes in pertinent part, that no person may operate a restricted category civil aircraft for other than the special purpose for which it is certificated or in an operation other than one necessary to accomplish the work activity directly associated with that special purpose.

Section 91.313(b), which prescribes in pertinent part, that operating a restricted category civil aircraft to provide flight crewmember training in a special purpose operation for which the aircraft is certificated is considered to be an operation for that special purpose.

**The petitioner supports its request with the following information:**

The petitioner states that Billings Flying Service supports the United States government in fire suppression operations and Billings Flying Service conducts these operations in S-61A and CH-47D type aircraft, which have been issued special airworthiness certificates in the restricted category.

Billings Flying Service pilots operating these aircraft are subject to the type rating requirements and proficiency check requirements prescribed in §§ 61.31 and 61.58. Billings Flying Service explains that the restrictions on the airworthiness certificate and those found in § 91.313 have recently been interpreted to restrict the aircraft use for type rating training and pilot-in-command (PIC) checks.

Billings Flying Service notes that it has conducted training and proficiency check for many years, and that such operations are safe, present no additional risk to the public, and are in the public interest. Billings Flying Service notes that it would perform no additional maneuvers or operations, above what they have conducted in the past, under an exemption. Operations conducted under an exemption, if granted, would be in the same location for training previously used by Billings Flying Service. The petitioner asserts that conducting these same operations, including those that would be under the oversight of an FAA Designated Pilot Examiner (DPE), Aviation Safety Inspector, or Pilot Proficiency Examiner (PPE), present no additional risk and are in the public interest.

The FAA has determined that good cause exists for not publishing a summary of the petition in the Federal Register because this is not a precedent-setting petition, and any delay in acting on this petition would be detrimental to Billings Flying Service.

**The FAA's analysis is as follows:**

The FAA has fully considered the petitioner's request and supporting information and determined that the relief requested meets an equivalent level of safety and is in the public interest.

Although the petition requests relief from § 91.313(b), the FAA does not believe that an exemption from that provision is necessary. This provision allows an operator to consider training for the special purpose operation for which the aircraft is certificated to be an operation for that special purpose. Since Billings Flying Service will not be conducting training directly related to the special purpose under this exemption, relief from § 91.313(b) is not required.

As noted, § 91.313(a) states that "no person may operate a restricted category civil aircraft for any purpose other than the special purpose for which it is certificated" or "in an operation other than one necessary to accomplish the work activity directly associated with that special purpose." Special purpose operations for restricted category aircraft are outlined in § 21.25(b). The FAA has recently determined that practical tests for the addition of a type rating

designation to a pilot certificate, training in preparation for such practical tests, or other flights necessary for the conduct of such practical tests, would be contrary to the limitations described in § 91.313(a). The FAA recognizes that the recent determination creates a regulatory barrier for operators needing to conduct flights to meet the type rating requirements of § 61.31 when a standard category aircraft in the same category, class, and type is not reasonably available to the operator.

The FAA notes that its determination that restricted category aircraft cannot be used for practical test for type ratings, does not apply to proficiency checks accomplished by those pilots that already hold the requisite type rating and whose duties are to perform an operation described in § 91.313(a). These flights, such as flights needed to satisfy the PIC proficiency checks required by § 61.58 (and associated PPE observations), are considered necessary to accomplish the work activity directly associated with the aircraft's special purpose and would not require regulatory exemption.

The FAA believes that the fire suppression operations conducted by Billings Flying Service are a benefit to the public. Since these operations cannot be conducted without appropriately trained and certificated pilots, the FAA finds that Billings Flying Service request for exemption would also be in the public interest. The FAA also believes that safety is enhanced by enabling the conduct of a practical test to add a type rating, as well as the training in preparation for that practical test, in the aircraft or aircraft type that will be operated by the pilot during the special purpose operation.

The FAA recognizes that airworthiness standards for restricted category aircraft do not meet the same level of safety that is required for aircraft certificated in the standard or transport category. The operating limitations set forth in § 91.313 are designed to compensate for this and to provide the necessary level of safety for special purpose operations. However, the FAA finds that an equivalent level safety would be met by the conditions/limitations provided in this exemption. The FAA has issued grants of exemption in circumstances similar in all material respects to those presented in your petition. In Grant of Exemption No. 10863 (copy enclosed), the FAA found that an exemption was appropriate to allow the Sikorsky Aircraft Corporation (Sikorsky) to utilize a restricted category aircraft S-61 to conduct part 61 flight crewmember training including for those pilots not employed by Sikorsky. The FAA is issuing Billings Flying Service similar conditions and limitations as were issued in Exemption No. 10863, with modifications necessary to meet the requested relief, as described below.

Exemption No. 10863 was based, in part, on that fact there are no standard category short body S-61's available for use by Sikorsky. Condition/Limitations No. 1 of Exemption No. 10863 prescribed that the exemption would terminate upon availability of a standard category short body S-61. This condition and limitation was appropriate for the exemption, as the aircraft was being utilized by Sikorsky to train pilots other than those employed by Sikorsky. The condition acknowledged that, when a standard category short body S-61 became available, there would be an acceptable avenue for these other entities to obtain training without the need to utilize a restricted category aircraft. The FAA supports the use of

restricted category aircraft for flight training and practical tests for type ratings for those pilots who are employed by an operator to perform special purpose operations in these aircraft. The FAA believes that, for those pilots who are not employed by an operator, the use of restricted category aircraft for flight training and practical tests should be allowed only under narrow circumstances. Since Billings Flying Service has not requested to provide training to pilots that are not employed by the petitioner, the FAA has removed condition and limitation No. 1 found in Exemption No. 10863.

The relief granted in this exemption allows Billings to operate a restricted category aircraft for a practical test necessary for its pilots to obtain a type rating designation as required by § 61.31. In addition, the exemption allows Billings to train pilots in preparation for these practical tests. The FAA is limiting this relief to those pilots, employed by Billings Flying Service, who have the intent of participating in a special purpose operation for which the listed aircraft are certificated. The exemption would also grant relief for any flights necessary to designate a DPE in one of the aircraft types listed in Condition/Limitation No. 1. The limitation on using this exemption outside of these purposes, and by other operators, is contained in Condition/Limitation Nos. 2 and 5.

The FAA finds that an exemption from § 91.313(c) is required for Billings to conduct the operations described in the petition. Recent legal interpretation by the FAA recognizes an instructor who is being paid to provide flight training in an aircraft is operating the aircraft for compensation or hire regardless of whether he or she is acting as pilot in command. The same principle applies to DPEs providing practical tests. The FAA does not seek to restrict Billings Flying Service from providing compensation to those conducting training or practical tests functions in the aircraft covered under this exemption. However, Billings Flying Service can only conduct such flights if the person receiving training will be conducting special purpose operations on behalf of the operator; or, in the case of a DPE, will be conducting practical tests for the operator's pilots. The FAA has captured this policy in Condition/Limitation Nos. 3 and 5.

The FAA has reviewed the condition and limitations and limitations pertaining to maintenance requirements for similar operators. The FAA finds the Type Certificate Data Sheet (TCDS) for the S-61A (H2EA) and TCDS for the CH-47D (R0011DE) provide instruction on how the helicopters will be serviced, inspected and maintained. The FAA has captured the requirement to adhere to the TCDS instructions in Condition/Limitation Nos. 8 and 9.

### **The FAA's Decision**

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. §§ 106(f), 40113 and 44701 delegated to me by the Administrator, Billings Flying Service is granted an exemption from 14 CFR § 91.313(a) and (c) to the extent necessary to allow Billings Flying Service to conduct

operations in restricted category S-61A and CH-47D aircraft, subject to the conditions and limitations listed below.

### **Conditions and Limitations**

1. The privileges of this exemption are limited to the following aircraft:
  - a. Sikorsky S-61A: N561SC; and.
  - b. CH-47D: N401AJ, N561AJ and N562AJ.
2. Billings Flying Service must be in full operational control of any aircraft operated using the privileges of this exemption.
3. The relief from § 91.313(c) is only granted to the extent necessary to allow for the operations described in Condition/Limitation No. 5.
4. All routes and locations used during any operation conducted under this exemption must be accepted by the CHDO in the geographic region where the aircraft is to be operated.
5. Billings Flying Service may only use the aircraft for the special purposes identified on the restricted category airworthiness certificate for the aircraft in Condition/Limitation No. 1 and the following operations:
  - a. Practical tests necessary to issue type ratings required by § 61.31(a) to pilots employed by Billings;
  - b. Proficiency training for pilot employed by Billings Flying Service seeking to take a practical test for a type rating designation necessary to operate an aircraft covered under this exemption; and,
  - c. Observation flights performed with an Aviation Safety Inspector onboard for the purpose of designating or observing a Designated Pilot Examiner (DPE).
6. An aircraft configuration analysis including but not limited to flight deck, flight manual, operating limitations, and procedures must be completed and provided to the CHDO reflecting the capability of the aircraft to perform all required procedures and maneuvers necessary to meet the training, practical tests, and proficiency check requirements in part 61.
7. No person may operate an aircraft under the relief of this exemption at a weight greater than the weight that, with the critical engine inoperative, would permit a rate of climb of at least 50 feet per minute at an altitude of at least 1,000 feet above the elevation of the highest ground or obstruction within the area to be operated or at an altitude of 5,000 feet, whichever is higher.

8. The S-61A aircraft listed in Condition/Limitation No. 1(a) must be serviced and maintained in accordance with Type Certificate Data Sheet (H2EA).
9. The CH-47D aircraft listed in Condition/Limitation No. 1(b) must be serviced and maintained in accordance with Type Certificate Data Sheet (R0011DE).
10. A copy of this exemption must be provided to the CHDO in the geographic region where the aircraft is based and must be carried aboard the aircraft at all times.
11. Failure to meet any of the conditions of this exemption immediately cancels the authority authorized by this exemption.

This exemption terminates on February 28, 2017, unless sooner superseded or rescinded.

Issued in Washington, D.C., on February 18, 2015

/s/

John Barbagallo  
Acting Deputy Director, Flight Standards Service

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

R0011DE  
Billings Flying Service, Inc.  
CH-47D  
Revision 2  
February 18, 2015

TYPE CERTIFICATE DATA SHEET R0011DE

This data sheet, which is a part of Type Certificate No. R0011DE, prescribes conditions and limitations under which the product for which the type certificate was issued meets the airworthiness requirements of the 14 Code of Federal Aviation Regulations (14 CFR).

Type Certificate Holder: Billings Flying Service, Inc.  
6309 Jellison Road  
Billings, MT 59101

Type Certificate Holder Record: N/A

I Model CH-47D (Restricted Category Rotorcraft) Approved July 22, 2014. (See NOTES Section)

Engines (2) Honeywell T55-GA-714A

Fuel ASTM-D1655 (Jet A, Jet A-1, Jet B); JP-8, JP-5, JP-4, Alternative and emergency fuels are listed in Operators Manual BFS-210 "CH-47D Helicopter", Rev. Original, dated July 21, 2014 or later FAA approved revision.

Engine and  
Transmission Limits

Rating	Torque (% Q)	Gas Gen. Speed (%Ng)	Power Turbine Speed (%N <sub>p</sub> )	Power Turbine Inlet Temp
<b>Dual Engine Limits</b>				
Take-Off (10 Min.)	100%	110%	111%	899
Military Power (30 Min.)	100%	-----	-----	854
Normal Continuous	100%	-----	-----	816
Maximum Transient	100%	110%	111%	943
<b>One Engine Limits</b>				
One Engine Inop (10 Min.)	123%	110%	111%	899
One Engine Inop (30 Min.)	123%	-----	-----	854
Normal Continuous	123%	-----	-----	816
Maximum Transient	123%	110%	111%	943

Refer to Billings Flying Service, Inc., Rotorcraft Flight Manual no. BFS-210 "CH-47D Helicopter", Rev. Original, Dated July 21, 2014 or later FAA approved revisions for additional limitation data.

Rotor Speed Limits

Minimum  
Maximum

Power Off

91% r.p.m.  
108% r.p.m.

Power On

91% r.p.m.  
111% r.p.m.

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Airspeed Limits

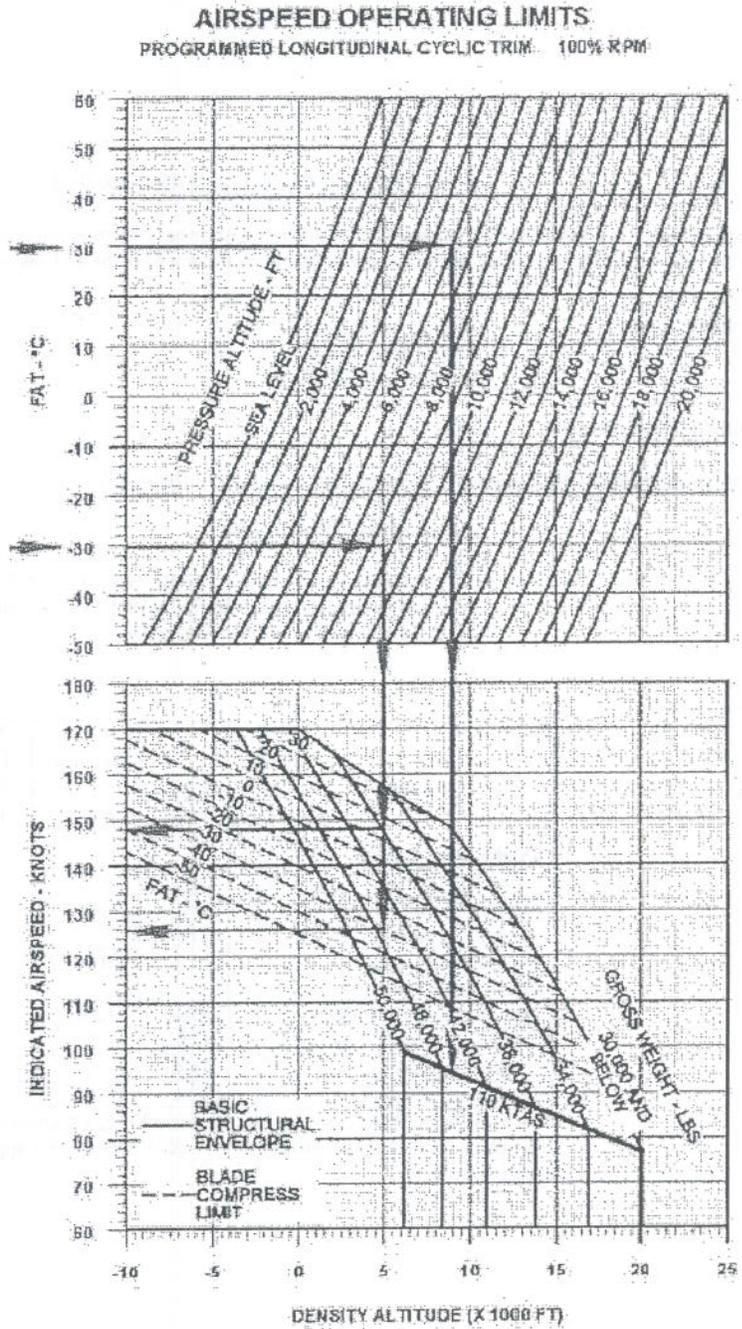
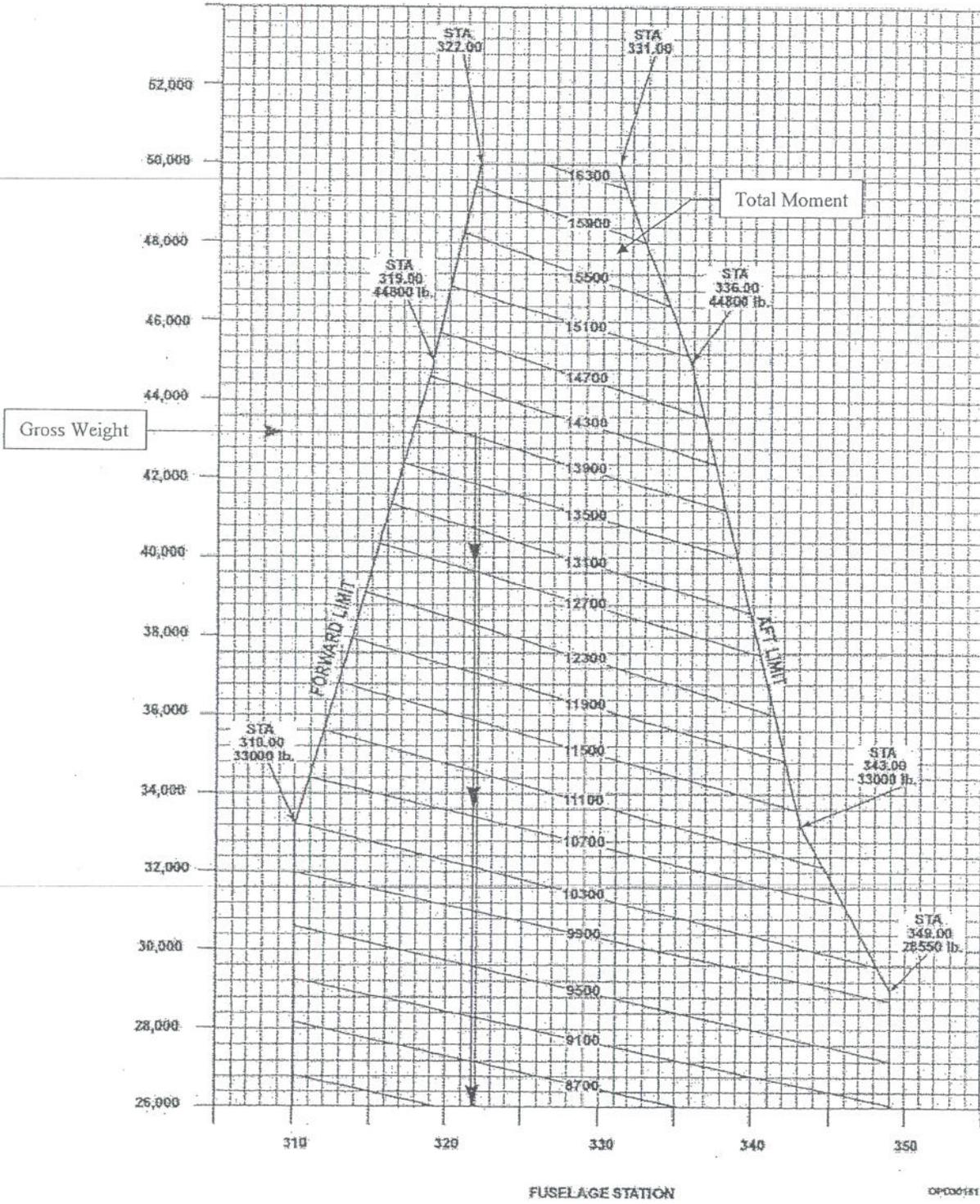


Figure 1

Refer to Rotorcraft Flight Manual BFS-210 "CH-47D Helicopter", Rev. Original, Dated July 21, 2014 or later FAA approved revision for abnormal conditions.

CENTER OF GRAVITY LIMITS  
ARM - INCHES



### Figure 2

Refer to Rotorcraft Flight Manual no. BFS-210 "CH-47D Helicopter", Rev. Original, Dated July 21, 2014 or later FAA approved revision for specific C.G. range and limits.

Datum	Station 0 (Datum is 21.5 inches forward of the forward most point of the nose section).	
Leveling Means	Plumb bob from top of forward door opening.	
Maximum Weight	50,000 lbs.	
Cargo Hook Limitations.	<p>The limits presented below are structural limitations only.</p> <p>a. The structural limit of the forward and aft hook is 17,000 pounds each.</p> <p>b. The maximum single load that can be suspended as a tandem load from the forward and aft hooks is 25,000 pounds.</p> <p>c. The center cargo hook is limited to a maximum load of 26,000 pounds.</p>	
Minimum Crew	3 – (1) pilot (+75), (1) copilot (+75), (1) Crewmember (+135) (See Note 11).	
Maximum Cargo	Refer to Rotorcraft Flight Manual No. BFS-210 "CH-47D Helicopter", Rev. Original, Dated July 21, 2014 or later FAA approved revision for various configurations.	
No. of Seats	See Note 9	
Fuel Capacity	Left Main - 278 Gallons Left Fwd Aux - 122 Gallons Left Aft Aux - 118 Gallons	Right Main - 274 Gallons Right Fwd Aux - 119 Gallons Right Aft Aux - 117 Gallons
Oil Capacity	Total is 6887 lb. (1028 Gallons) Note: These are maximum capacities which include residual and trapped fuel. Servicing capacities will be less. Refer to Rotorcraft Flight Manual No. BFS-210 "CH-47D Helicopter", Rev. Original, Dated July 21, 2014 or later FAA approved revision for various configurations.	
Rotor Blade and Control Movements	7.5 gal. (3.75 Gallons per engine). This is maximum capacity which includes residual and trapped oil. Servicing capacities will be less. See Note 1 for data on systems, fuel, and oil.	
Other Limits	For rigging information, refer to TM 1-1520-240-23 series Technical Manuals.	
Serial No. Approved	This helicopter must be operated in accordance with the following: <ol style="list-style-type: none"> <li>(1) Billings Flying Service, Inc. Report No. BFS-210, Rotorcraft Flight Manual "CH-47D Helicopter", Rev. Original, dated July 21, 2014 or later FAA approved revisions</li> <li>(2) Billings Flying Service, Inc. Report No BFS-208, Functional Check Flight Manual for the BFS CH-47D Helicopter dated July 21, 2014 or later FAA accepted revisions.</li> <li>(3) Billings Flying Service, Inc. Report No. BFS-206, Crewmember's Checklist dated July 21, 2014 or later FAA accepted revisions</li> </ol>	
Certification Basis	U.S. military surplus CH-47D helicopters as identified in Type Certificate Data Sheet R0011DE Approved Serial Number List, Billings Flying Service, Inc., Report Number BFS-204 TC01, Rev. Original dated July 24, 2014, or later FAA approved revision.	
	Part 21 § 21.25(a)(2), (b)(1)(2) & (7) Rotorcraft External Load Operations & Carriage of Cargo – incidental to the operator's business.	

*Three Limitations:*

## (1) Agricultural operations under FAR 21.25(b)(1)

Note: In accordance with FAR 36.1(a)(4), compliance with the noise requirements was not shown. Therefore, aircraft certificated under this type certificate are only eligible for agricultural operations excepted by FAR 36.1(a)(4) and defined under FAR 137.3  
Any alterations to the helicopter for Special Purposes not identified above require further FAA approval and in addition, may require noise and/or flight testing

## (2) Forest and Wildlife Conservation operations under FAR 21.25(b)(2)

Note: In accordance with FAR 36.1(a)(4), compliance with the noise requirements was not shown. Therefore, aircraft certificated under this type certificate are only eligible for dispensing firefighting materials excepted by FAR 36.1(a)(4) and defined under FAR 137.3

## (3) External Cargo Operations under FAR 21.25(b)(7)

Note: In accordance with FAR 36.1(a)(4), compliance with the noise requirements was not shown. Therefore, aircraft certificated under this type certificate are only eligible for external load operations excepted by FAR 36.1(a)(4) and defined under FAR 133.1(b).

General Note: Any subsequent modifications to the helicopters type certified under this Type Certificate are to have the certification basis for that modification established under 14 CFR part 21 § 21.101. Otherwise non-significant modifications are to meet the requirements of 14 CFR 29 Amendment 1, effective August 12, 1965 and 14 CFR part 29 § 29.1529, Instructions for Continued Airworthiness, Amendment 20, effective September 11, 1980.

Date of Application	March 5, 2014
Duration	This Type Design is effective until January 22, 2016, only. This limitation may be removed, as appropriate, by the responsible ACO through revision of this TCDS.
Production basis	None. No helicopters may be produced under this approval. Each helicopter must pass a conformity inspection in accordance with this TCDS, plus any additional special instructions attached to the Request for conformity, FAA 8120-10. In addition, a check by the Type Certificate holder or its agent, of the flight characteristics in accordance with applicable portions of the BFS CH-47D FCF Functional Check Flight Manual for BFS Model CH-47D helicopters.
Equipment	The basic required equipment necessary for the particular special purpose operation must be installed for certification. Some MWOs provide installation of some types of firefighting equipment.

## NOTES

NOTE 1. A current weight and balance report including a list of equipment included in the certified empty weight, and loading instructions when necessary, must be provided for each helicopter at the time of original airworthiness certification.

NOTE 2. The following placards must be prominently displayed in the cockpit in full view of the pilots:

Placard No. 1

THIS HELICOPTER MUST BE OPERATED IN COMPLIANCE WITH THE OPERATING LIMITATIONS SPECIFIED IN THE FAA APPROVED HELICOPTER

FLIGHT MANUAL No. BFS-210 "CH-47D HELICOPTER", REV. ORIGINAL,  
DATED JULY 21, 2014 OR LATER FAA APPROVED REVISION.

Placard No. 2

THIS ROTORCRAFT MUST BE OPERATED IN ACCORDANCE WITH THE  
RESTRICTED CATEGORY OPERATING LIMITATIONS OF 14 CFR PART 91.313.

- NOTE 3. The builder's data plate required by part 45 § 45.13 must be installed in accordance with Billings Flying Service, Inc. Drawing BFS-001, Rev. Original dated June 20, 2014, or later FAA approved revisions.
- NOTE 4. The helicopter(s) must be serviced, maintained, inspected, repaired and overhauled in accordance with the requirements specified in Billings Flying Service, Inc. Instructions for Continued Airworthiness Report BFS-202 Rev. Original dated June 25, 2014 or later FAA accepted revision. The life-limited parts, overhaul, and retirement intervals for these helicopters are specified in Section IV of this report. A FAA approved/accepted copy must accompany each helicopter on delivery.
- Components that have been maintained under methods other than those prescribed in the Airworthiness Limitation Section IV, shall be subject to the following: The certification life limits for the helicopter, its engine and appliances were based on satisfactory service history as designed and operated by the military. Therefore, cycle counting and operational time tracking is required on certain critical components, to operate and maintain the aircraft to the original acceptance criteria, and maintain it's safe for intended use requirement.
- NOTE 5. Billings Flying Service, Inc. Engineering Configuration Report BFS-201, Rev. Original dated March 31, 2014, or later FAA approved revision identifies the de-configuration, addition of equipment, and U.S. Army airframe changes necessary for the special purpose helicopter.
- NOTE 6. A Restricted Category helicopter may not be operated in a foreign country without the express written approval of that country.
- NOTE 7. This helicopter has not been shown to meet the requirements of the applicable comprehensive and detailed airworthiness code as provided by Annex 8 to the Convention on International Civil Aviation.
- NOTE 8. The Safety of Flight Compliance Report for the helicopter contained in Billings Flying Service, Inc., Airworthiness & Military Safety Messages report no. BFS-205, Rev. Original, dated March 31, 2014, or later FAA Approved revision, must be complied with prior to original airworthiness certification.
- NOTE 9. 1) No person may be carried in this helicopter during flight unless that person is essential to the purpose of the flight.  
2) This Helicopter is prohibited from carrying cargo for compensation or hire. Carriage of internal cargo is limited to such cargo that is incidental to the helicopter owners/operators business, which is other than air transportation.  
3) Carriage of hazardous material is prohibited unless compliance is shown with applicable regulations in Code of Federal Regulations Title 49, Part 175.
- NOTE 10. Any Alteration to the type design of this aircraft may require Instructions for Continued Airworthiness (ICA's). Changes to the Type Design by means of a Supplemental Type

Certificate (STC) requiring ICA's or changes to existing ICA's must be submitted and reviewed by the Fort Worth Aircraft Evaluation Group (FTW-AEG). Type Design Changes by means of a Field Approval that require ICA's must have those ICA's reviewed by the Flight Standards District Office (FSDO) managing the Field Approval or the FTW-AEG

## NOTE 11.

Non-Pilot crewmembers will be trained in accordance with the Billings Flying Service, Inc. Rotorcraft Flight Manual "CH-47D Helicopter", as amended; the Billings Flying Service, Inc. Functional Check Flight Manual for the Billings Flying Service, Inc CH-47D Helicopter, as amended; and the Billings Flying Service, Inc. Crewmember's Checklist as amended.

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END

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DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

R00051SE  
Revision 0  
Columbia Helicopters, Inc  
  
CH-47D  
  
November 4, 2014

TYPE CERTIFICATE DATA SHEET NO. R00051SE

This data sheet, which is a part of type certificate No. R00051SE, prescribes conditions and limitations under which the product for which the type certificate was issued meets the airworthiness requirements of the 14 Code of Federal Aviation Regulations (14 CFR).

Type Certificate Holder Columbia Helicopters, Inc.  
14452 Arndt Road, NE  
Aurora, OR 97002

Type Certificate Holder Record: N/A

**I - Model CH-47D (Restricted Category Military Surplus Helicopter) Approved October XX, 2014**

Engine Two (2) Honeywell T55-GA-714A  
  
Fuel ASTM-D1655 JP-8, JP-5, JP-4, (Jet A, Jet A-1, Jet B) (See Note 11 for Alternative and Emergency Fuels)

Engine Operating Limits - (Normal Operation)

Rating	Torque (% Q)	Gas Gen. Speed (%Ng)	Power Turbine Speed (%Np)	Power Turbine Inlet Temp (PTIT) °C
<b>Dual Engine Limits</b>				
Take-Off (10 Min.)	100%	110%	111%	899
Military Power (30 Min.)	100%	-----	-----	854
Normal Continuous	100%	-----	-----	816
Contingency Power (Max. for not more than 2.5 minutes)	-----	-----	-----	930
Maximum Transient (for not more than 12 seconds)	100%	110%	111%	940
<b>One Engine Limits</b>				
One Engine Inop (10 Min.)	123%	110%	111%	899
One Engine Inop (30 Min.)	123%	-----	-----	854
Normal Continuous	123%	-----	-----	816
Contingency Power (Max. for not more than 2.5 minutes)	-----	-----	-----	930
Maximum Transient (for not more than 12 seconds)	123%	110%	111%	940

Rotor Limits

	<u>Power Off</u>	<u>Power On</u>
Minimum	91% r.p.m	91% r.p.m
Maximum	108% r.p.m	111% r.p.m

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Airspeed limits

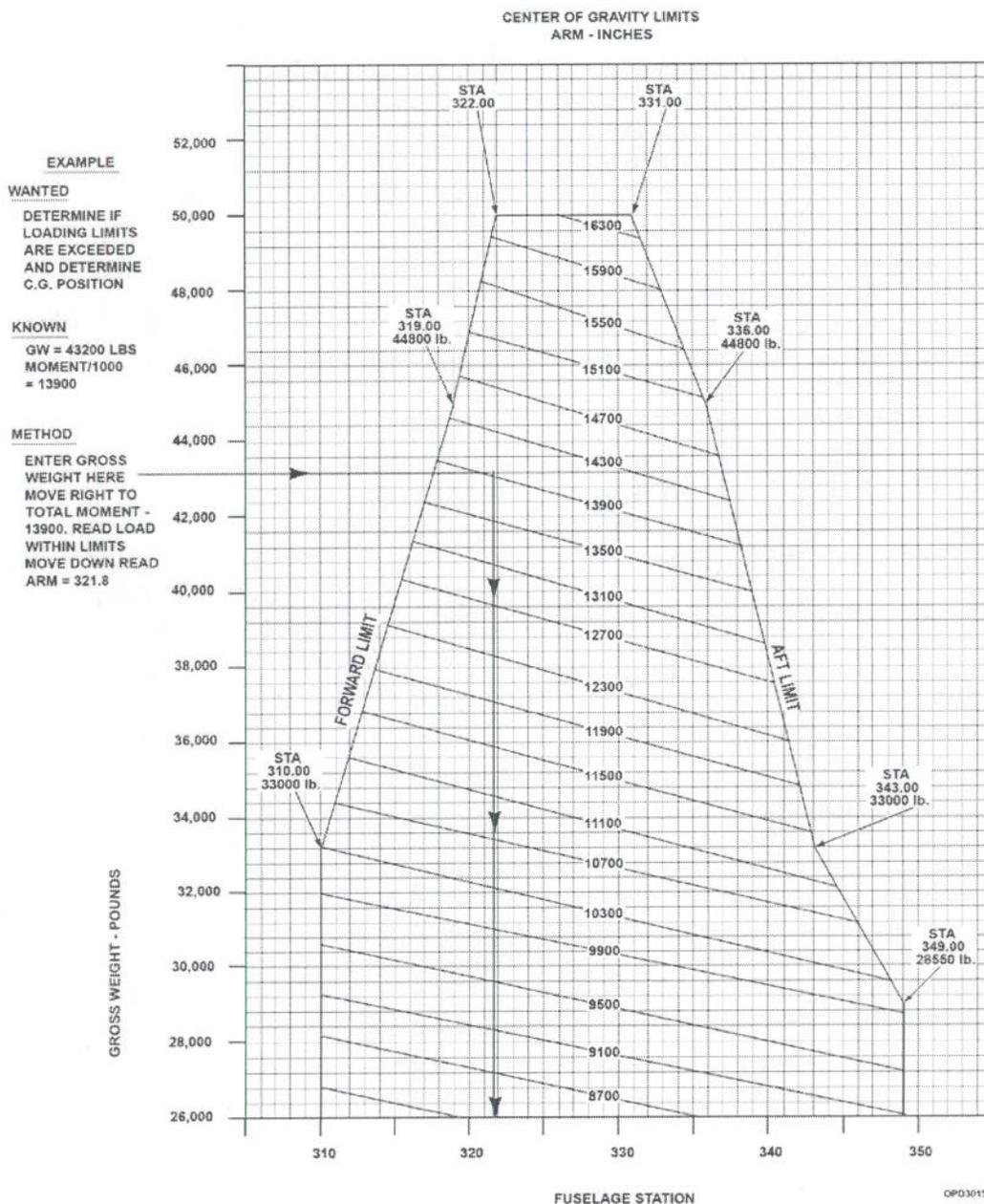
Vne (never exceed): 170 KIAS at Sea Level. See Columbia Helicopters, Inc., CH-47D Rotorcraft Flight Manual, 47-1, revision 0, dated October 15, 2014 or later FAA approved revisions, for variations of Vne with rotor r.p.m., gross weight, pressure altitude and temperature.

Sideward Flight (maximum): 45 KIAS

Rearward Flight (maximum): 45 KIAS

C.G. range

Most forward C.G. Sta. +310.00  
 Most Aft C.G. Sta. +349.00  
 (+322.00) to (+331.00) at 50,000 lb.  
 (+319.00) to (+336.00) at 44,800 lb.  
 (+310.00) to (+343.0) at 33,000 lb.  
 (+310.00) to (+349.0) at 28,550 lb. or less



Empty weight C.G. range	None
Datum	Station 0 (datum is 21.5 inches forward of the most forward point of the nose section)
Leveling means	Plumb bob hook at top of main cabin door interior trim forward of Sta. 150. Plumb target under main cabin door sill forward of Sta. 150 at BL 48.3. Plumb line from upper hook to target.
Maximum weight	50,000 lb.
Cargo Hook Limitations	The limits presented below are structural limitations only. a. The structural limit of the forward and aft hook is 17,000 pounds each. b. The maximum single load that can be suspended as a tandem load from the forward and aft hooks is 25,000 pounds. c. The center cargo hook is limited to a maximum load of 26,000 pounds.
Minimum Crew	3 (1 pilot, 1 copilot, 1 flight crewmember)
No. of Seats	See Columbia Helicopters, Inc., Configuration Report, Restricted Category Type Certificate, Model CH-47D Helicopter, document 14-RDE-0635, revision A, dated August 29, 2014, or later FAA approved revisions.
No. of Passengers	None (see Note 10)
Maximum Compartment Weights	Refer to Columbia Helicopters, Inc., CH-47D Rotorcraft Flight Manual, 47-1, revision 0, dated October 15, 2014 or later FAA approved revisions for various configurations.
Fuel Capacity	1028 gal. (total); 278 gal. (Left Main Tank) Sta. +317.30 274 gal. (Right Main Tank) Sta. +317.30 122 gal. (Left Fwd Aux Tank) Sta. +214.00 119 gal (Right Fwd Aux Tank) Sta. +214.00 118 gal. (Left Aft Aux Tank) Sta. +414.00 117 gal. (Right Aft Aux Tank) Sta. +414.00  Unusable fuel; 1) 4.0 gal. Sta. +316.00 2) 5.8 gal. Sta. +357.00  The full tank usable fuel weight will vary depending upon fuel specific weight. See Columbia Helicopters, Inc., CH-47D Rotorcraft Flight Manual, 47-1, revision 0, dated October 15, 2014 or later FAA approved revisions.
Oil capacity	3.75 gal. per engine, Sta. +480.7 These are maximum capacities which include residual and trapped oil/fuel. Servicing capacities will be less. See Columbia Helicopters, Inc., CH-47D Rotorcraft Flight Manual, 47-1, revision 0, dated October 15, 2014 or later FAA approved revisions.
Rotor Blade and Control Movements	For rigging information see Note 3.
Serial No. Approved	U.S. Military Surplus CH-47D helicopters as identified in Columbia Helicopters, Inc., Serial Number Report, Restricted Category Type Certificate, Model CH-47D Helicopter, document 14-RDE-0630, revision A, dated September 23, 2014 or later FAA approved revision.

Date of Application	April 30, 2014
Certification basis	<p>Part 21 § 21.25(a)(2) effective February 1, 1965, including Amendments 21-1 through 21-92 for the special purpose of:</p> <p>1) Forest and Wildlife Conservation Operations under § 21.25(b)(2). Note: In accordance with § 36.1(a)(4), compliance with the noise requirements was not shown. Therefore, aircraft certificated under this type certificate are only eligible for aerial dispensing of liquids and forest conservation material excepted by § 36.1(a)(4) and defined under § 137.3.</p> <p>2) Other Special-Purpose Operations under § 21.25(b)(7). Includes external load operations for the carriage of cargo external to the fuselage. Note: In accordance with § 36.1(a)(4), compliance with the noise requirements was not shown. Therefore, aircraft certificated under this type certificate are only eligible for carrying external loads excepted by § 36.1(a)(4) and defined under § 133.1(b).</p> <p>Any alteration to the aircraft for Special Purposes not identified above require further FAA approval and in addition, may require noise and/or flight testing.</p> <p>General Note: Any subsequent modifications to the helicopters type certified under this Type Certificate are to have the certification basis for that modification established under 14 CFR § 21.101, Amendment 21-96, Effective February 4, 2013. Otherwise, non-significant modifications are to meet the requirements of 14 CFR § 29 dated February 1, 1965, including Amendments 29-1 through 29-20 and 14 CFR § 29.1529, Instructions for Continued Airworthiness, Amendment 20, effective September 11, 1980.</p>
Production basis	<p>None. No helicopters may be produced under this approval. Each helicopter must pass a conformity inspection in accordance with this TCDS, plus any additional special instructions attached to the request for conformity, FAA Form 8120-10. In addition, a check by the Type Certificate holder or its agent, of the flight characteristics in accordance with applicable portions of the Maintenance Test Flight Manual for CH-47D Civilian Helicopter, dated 11 March 2014, as appropriate for each aircraft, or other FAA approved manual must be accomplished.</p>
Equipment	<p>The basic required equipment as prescribed in the applicable airworthiness regulations (See Certification Basis) must be installed in the helicopter for certification. In addition, the following items of equipment are required with each helicopter:</p> <ol style="list-style-type: none"><li>1. Columbia Helicopters, Inc., CH-47D Rotorcraft Flight Manual, 47-1, revision 0, dated October 15, 2014 15, 2014 or later FAA approved revisions.</li><li>2. Columbia Helicopters, Inc., Configuration Report, Restricted Category Type Certificate, Model CH-47D Helicopter, document 14-RDE-0635, revision A, dated August 29, 2014, or later FAA approved revisions.</li></ol>

#### NOTES

- NOTE 1. A current weight and balance report including a list of equipment included in the certificated empty weight, and loading instructions when necessary, must be in each helicopter at the time of original airworthiness certification and at all times thereafter. The certified empty weight and corresponding C.G. locations must include unusable fuel. Refer to Columbia Helicopters, Inc., CH-47D Rotorcraft Flight Manual, 47-1, revision 0, dated October 15, 2014 or later FAA approved revisions.

- NOTE 2. The following placards must be displayed in front of and in clear view of the pilots:
- Placard No. 1
- THIS HELICOPTER MUST BE OPERATED IN COMPLIANCE WITH THE OPERATING LIMITATIONS SPECIFIED IN THE APPROVED ROTORCRAFT FLIGHT MANUAL.
- Placard No. 2
- THIS ROTORCRAFT MUST BE OPERATED IN ACCORDANCE WITH THE RESTRICTED CATEGORY OPERATING LIMITATIONS OF 14 CFR PART 91 § 91.313.
- NOTE 3. These helicopters must be serviced and maintained in compliance with the documents specified in Columbia Helicopters, Inc., Continued Airworthiness Report, Restricted Category Type Certificate, Model CH-47D Helicopter, document 14-RDE-0636, revision IR, dated August 15 2014, or later FAA approved revision. Retirement times and FAA required inspections are listed in FAA approved Airworthiness Limitations Section (Section 2 of the above document) dated August 15 2014, or later FAA approved revision. A FAA approved/accepted copy must accompany each helicopter on delivery.
- NOTE 4. The builder's data plate required by part 45 § 45.13 must be installed in accordance with Columbia Helicopters, Inc., Serial Number Report, Restricted Category Type Certificate, Model CH-47D Helicopter, document 14-RDE-0630, revision A, dated September 23, 2014 or later FAA approved revision.
- NOTE 5. This helicopter must be operated in accordance with Columbia Helicopters, Inc., CH-47D Rotorcraft Flight Manual, 47-1, revision 0, dated October 15, 2014 or later FAA approved revision.
- NOTE 6. This helicopter is prohibited from carrying cargo for compensation or hire. Carriage of cargo is limited to such cargo that is incidental to the helicopter owners/operator's business, which is other than air transportation.
- NOTE 7. A restricted category helicopter may not be operated in a foreign country without the express written approval of that country.
- NOTE 8. This helicopter has not been shown to meet the requirements of the applicable comprehensive and detailed Airworthiness Code as provided by Annex 8, to the Convention of the International Civil Aviation Organization.
- NOTE 9. The U.S. Army Safety Messages for the helicopter and engine contained in Columbia Helicopters, Inc., Configuration Report, Restricted Category Type Certificate, Model CH-47D Helicopter, document 14-RDE-0635, revision A, dated August 29, 2014, or later FAA approved revision, must be complied with prior to original airworthiness certification.
- NOTE 10. No person may be carried in this helicopter during flight unless that person is essential to the purpose of flight.
- NOTE 11: Alternative and emergency fuels are listed in Columbia Helicopters, Inc., CH-47D Rotorcraft Flight Manual, 47-1, revision 0, dated October 15, 2014, Chapter 8, or later FAA approved revisions.
- NOTE 12: Any alteration to the type design of this aircraft may require Instructions for Continued Airworthiness. If so, these instructions must be submitted and accepted by the FAA Fort Worth Aircraft Evaluation Group (FTW-AEG) and the Airworthiness Limitations Section approved by the Seattle Aircraft Certification Office (SACO), prior to approval for return to service.

...END...

## Commonality and Differences in Training Report - Columbia Model 234 and CH-47D Chinook

Flight Standards Fort Worth AEG Office and associate ASI's from Portland, OR FSDO convened a meeting with Columbia Helicopters, Inc. February 19 and 20, 2015 to ascertain commonality and differences in training requirements for flight crewmembers in both the Columbia's Model 234 and Military Surplus Boeing Model CH-47D Chinook.

The Model 234 is Type Certificated in Transport Category CFR Part 29 Rotorcraft with 2 crewmembers, a pilot and copilot, and each pilot is required to hold a BV-234 type rating in the aircraft. All training, checking and currency requirements are conducted in accordance with Columbia Helicopters, Inc. CFR Part 135 operating certificate. The CH-47D is Type Certificated in Restricted Category under CFR Part 21.25 limitations, with three crewmembers, pilot, copilot and third crewmember. All training, log book endorsements and testing is conducted under CFR Part 61 requirements.

The Model 234 was identified as the Base aircraft in performing the comparison to the CH-47D. Actual aircraft equipment system configurations, Flight Manuals and training programs were reviewed during the meeting. Actual flight handling and performance characteristics were not demonstrated during this meeting. Columbia Helicopter pilots reported both aircraft are perceived to be the same.

This report reflects a comparison in training and checking a crewmember should master to transition from Model 234 to CH-47D. This is depicted in attached "Related Aircraft Differences Training and Checking Table - Columbia Model 234 and CH-47D Chinook". Within the table, the Column Titled "PROC CHNG" (Procedure Change) identified with "Yes", are aircraft system/equipment differences, performance items, or crewmember procedural changes that must be trained and tested. Additionally, Column Titled "CHK" (Checking Level) identified with "D\*", indicates that the crewmember should be evaluated in the aircraft to determine if they are proficient in performance of the specified task.

Summary of differences between the Model 234 to CH-47D was taken from "Related Aircraft Differences Training and Checking Table" is as follows:

Element	Remarks
Max Weights	Max Weights increase from 48,500 lbs to 50,000 lbs internal and external loads.
Limitations	Engine Limits and performance charts depicted differently between civilian and military formats in FMs.
Placards and Markings	Operation in accordance with FM. Restricted Category placards. Engine limited time markings for operations.

## Commonality and Differences in Training Report - Columbia Model 234 and CH-47D Chinook

Element	Element
Powerplant	Differences in powerplant - Honeywell T55-GA-714A increased Sea Level 4,866 SHP.
Engine Start Proc.	FM - Normal Procedures Section. FADEC procedures. Cross wind limiter prior to startup.
Rejected Take Off	FM - Single engine failure during all phase of flight described.
Climb, Cruise & Descent	FM from one chart in Model 234 to sixty six climb, cruise and descent charts for CH-47D.
Normal Procedures	Fuel management of tanks in flight differences in fuel tanks. External Load operations - Three external hooks available.
Emergency Procedures	FADEC Emergency Failures Emergency electrical power via APU Engine and APU Fire - crewmember verification Emergency hydraulic distribution - Manual - via APU Vertical Gyro Failure
Auto Pilot Systems	AFCS (Advanced Flight Control System) <ul style="list-style-type: none"> <li>• Rate damping in all axis and sideslip stability.</li> <li>• Pitch and roll attitude hold and heading hold.</li> <li>• Airspeed Hold.</li> <li>• Improved control response in pitch, roll, and yaw.</li> <li>• Barometric and radar altitude hold.</li> <li>• Automatic coupled turns.</li> <li>• Longitudinal cyclic trim scheduling.</li> </ul>
Electrical Power	1 ea. 20 KVA generator on APU 1ea. 40 KVA on fwd and aft transmissions. DC power available automatic with AC available.
Equipment/Furnishings	Cargo configuration and mission essential crew Triple point cargo hook with electric and mechanical release in cockpit
Fire Protection	Eng. Fire detection and suppression system control handles and discharge switch. Janitor Heater Fire Detection no suppression. Crewmember monitors heater compartment. APU Fire procedure - no suppression system. APU Fire - crewmember verification.

## Commonality and Differences in Training Report - Columbia Model 234 and CH-47D Chinook

Element	Element
Fuel Controls	Fuel Capacity 2 Tanks @ 1,028 Gals. Up to 6 separate tanks. Fuel Management panel for cross feed and fuel tanks transfer controls.
Hydraulic Power	No. 1 hyd. Pump located fwd transmission. No. 2 located aft transmission. Utility pump located on aft transmission. Aux. pump driven by APU. Hyd. Pressure indicator lights in cockpit. Pressure, Temperature and quantity Gauges on aft crewmember maintenance panel.
Airborne Auxiliary Power	APU used for engine start and available in flight for emergency electrical and hydraulic power.
Doors	Cabin entry door fwd right door two piece – top/bottom. Aft cargo ramp cannot be removed. Crewmember must stand on cargo ramp to access maintenance panel. Emergency evacuation Training.
Fuselage	Cargo Flooring mounted to fuselage frame. Floor loading 300 lbs. per sq. ft. External winching system mounted fwd. right door. Cargo loading differences.
Main Rotor Drive	Aft transmission, combining transmission, No. 1 and 2 transmissions fwd transmission, 7 drive shafts, and Aft vertical drive shaft. Transmission cooling integral to each fwd and aft transmission. Aux lubrication system. Failure Aux pressure light indicated in cockpit. Chip detection and oil screen lights shown on crewmember maintenance panel.
Engine Fuel & Control	FADEC Automatic start process. Thrust lever switches engine trim active only emergency trim. Rheostat engine speed control. Power share by Torque or PTT limits. Emergency procedures unique to FADEC.
Engine Indicating	Engine Fuel Flow Indicator.
Starting	Engine common start switch and igniter enable key. Backup power for starting.

## Commonality and Differences in Training Report - Columbia Model 234 and CH-47D Chinook

<b>3<sup>rd</sup> Crewmember Duties</b>	
Engine Start Procedures	Crewmember validates APU start and running and maintenance panel status after starting engines.
Normal Procedures	In Flight Power Assurance checks – differences requires use of switch in cabin to be toggled by 3 <sup>rd</sup> crewmember.
Emergency Procedures	Engine and APU Fire – crewmember verification Transmissions Chip detection on aft maintenance panel. Hydraulic pressures, temperature and quantity gauges on aft maintenance panel.
Hydraulic Power	Pressure, Temperature and Quantity Gauges on aft. maintenance panel.
Main Rotor Drive	Chip detection and oil screen lights shown on crewmember maintenance panel.
Doors	Aft cargo ramp cannot be removed. Crewmember must stand on cargo ramp to access maintenance panel. Door must be open in horizontal plane. Crewmember must wear safety harness to prevent accidental egress. Emergency evacuation Training.

In summary significant advancements in aircraft systems were made by Boeing between the Model 234 and Military Surplus CH-47D as described in the above table. These improvements will impact training and qualifying the pilot and copilot to operate CH-47D. Since the CH-47D is certificated in Restricted Category it is not eligible for inclusion in an operator's 14 CFR 135 certificate training program. Only compliance requirements required will be 14 CFR Part 61 for pilot and copilot to be checked and typed to fly the aircraft. It is up to the Designated Pilot Examiner or FAA examiner to validate the pilots log book for proper training endorsements. Additionally, the 3<sup>rd</sup> crewmember needs some type of standards for training, being qualified and documentation to reflect qualifications. Since operations will be conducted under applicable 14 CFR 91, 133 and 137 operations, the operator needs some kind of documentation to show the 3<sup>rd</sup> crewmember is trained and qualified to perform assigned duties.

**Related Aircraft Differences Training and Checking Table Columbia Model 234 and CH-47D Chinook**

**Definitions used in the Tables:**

X	= Flight Manual/Pilot's Operating Handbook and/or FM Supplement
AI	= Aided Instruction
AFDS	= Auto Flight Display System
AVT	= Audio Visual Tapes
CBT	= Computer Based Training
ICBT	= Interactive Computer Based Training
FSTD	= Flight Simulation Training Device (Level 1 to 7)
FLT CHAR	= Flight Characteristics
FBS	= Fixed Base Simulator (Level 5 to 7)
FFS	= Full Flight Simulator (Level A, B, C, D)
Checking Levels	
B	= Checking level applied to particular task or specific system
D*	= Checking Level in the Aircraft to determine full pilot proficiency

**Related Aircraft Differences Training and Checking Table**

DIFFERENCE AIRCRAFT: CH-47D (TCDS R00051SE)

BASE AIRCRAFT: Model 234 (TCDS H9EA)

DESIGN	REMARKS	FLT CHAR	PROC CHNG	3 <sup>rd</sup> Crew	TRAINING					CHKG/CURR	
					LVL A	LVL B	LVL C	LVL D	LVL E		CHK
General Helicopter Configuration											
234	Landing Gear Location. Minimum Crew 2 (1 Pilot, 1 Copilot)			No							
CH-47D	Non removable fuel tanks Minimum Crew 3 (1 Pilot, 1 Copilot, 1 Flight Crewmember)			YES							
<b>Weights</b>											
234	Max Weight = 48,500 lbs. 51,000 lbs. Jettisonable External Load	No	No			CBT				B	
CH-47D	Max Weight = 50,000 lbs. for internal and external loads.	No	Yes			CBT				B	
<b>Limitations</b>											
234	Engine Limits and performance for CAT A & CAT B performance.	No	No			X				B	
CH-47D	Engine Limits and Planned Conditions charts for performance.	No	Yes			X				B	

**COMPLIANCE METHOD**

**TRAINING**

**CHKG/CURR**



DESIGN	REMARKS	FLT CHAR	PROC CHNG	3 <sup>rd</sup> Crew	LVL A	LVL B	LVL C	LVL D	LVL E	CHK	CURR
Flight Controls											
234	See System 27 Flight Controls description below.										
CH-47D	See System 27 Flight Controls description below.										
Aerodynamic Controls											
234	See System 27 Flight Controls description below.										
CH-47D	See System 27 Flight Controls description below.										
Preflight											
234	One page description for log book and walk around inspection.	No	No				AI			D*	
CH-47D	9 pages description for in depth check list for preflight.	No	Yes				AI			D*	
Engine Start											
234	FM – Normal Procedures Section. Manual Start Procedures. Rotor brake start up procedures.	No	Yes				AI			D*	
CH-47D	FM - Normal Procedures Section. FDAC procedures. Cross wind Limiter prior to startup. Crewmember validates APU start and running and maintenance panel status after starting engines.	No	Yes	Yes			AI			D*	
Taxi											
234	FM – Normal Procedures Section.	No	No				AI			D*	
CH-47D	FM – Normal Procedures Section.	No	No				AI			D*	
Takeoff											
234	FM – Vertical CAT A and Normal CAT A and B profiles (Differences training from CH-47D to model 234)	No	Yes*				AI			D*	
CH-47D	FM – Normal CAT B profile only.	No	Yes				AI			D*	

DESIGN	REMARKS	FLT CHAR	PROC CHNG	3 <sup>rd</sup> Crew	LVL A	LVL B	LVL C	LVL D	LVL E	CHK	CURR
Reject Take Off											
234	FM – Single engine failure during Vertical and Normal CAT A takeoff.	No	No				AI			D*	
CH-47D	FM – Single engine failure during all phase of flight described. Engine failure RTO needs to be trained.	No	Yes				AI			D*	
Climb Cruise Descent											
234	FM – one climb, cruise and descent chart.	No	No			CBT				B	
CH-47D	FM – sixty six climb, cruise and descent charts.	No	Yes			CBT				B	
Instrument Approaches											
234	I/S and non-precision approaches. (Differences training from CH-47D to model 234)	No	Yes				AI			D*	
CH-47D	N/A to CH-47D.	No	No				AI			D*	
Landing											
234	FM – Normal procedures CAT A & B approach speeds are the same.	No	No		X					D*	
CH-47D	FM - Normal procedures CAT B approach speeds are the same.	No	No		X					D*	
Shutdown											
234	FM – Normal Procedures Check list. Rotor Brake	No	No				AI			D*	
CH-47D	FM – Normal Procedures Check list	No	No				AI			D*	
Normal Procedures											
234	Fuel Management procedures. In flight power assurance check. External Load operations. Single point hook.	No	No				AI			D*	
CH-47D	Fuel Management procedures. In flight power assurance check- crewmember duty. External Load operations. Three hooks available.	No	Yes	Yes			AI			D*	



DESIGN	REMARKS	FLT CHAR	PROC CHNG	3 <sup>rd</sup> Crew	LVL A	LVL B	LVL C	LVL D	LVL E	CHK	CURR
2210 Auto Pilot Systems											
234	Automatic Flight Control System <ul style="list-style-type: none"> <li>• Flight Director Coupled to Nav</li> <li>• Go-around capability</li> <li>• Rate damping in all axes and sideslip stability.</li> <li>• Pitch and roll attitude hold and heading hold.</li> <li>• Airspeed Hold.</li> <li>• Improved control response in pitch, roll, and yaw.</li> <li>• Barometric and radar altitude hold.</li> <li>• Automatic coupled turns.</li> <li>• Longitudinal cyclic trim scheduling.</li> </ul>	No	No			CBT				D*	
CH-47D	AFCS (Advanced Flight Control System) <ul style="list-style-type: none"> <li>• Rate damping in all axis and sideslip stability.</li> <li>• Pitch and roll attitude hold and heading hold.</li> <li>• Airspeed Hold.</li> <li>• Improved control response in pitch, roll, and yaw.</li> <li>• Barometric and radar altitude hold.</li> <li>• Automatic coupled turns.</li> <li>• Longitudinal cyclic trim scheduling.</li> </ul>	No	Yes			CBT				D*	
23 Communications											
234	2 ea. VHF, 2ea. FM radio, transponder	No	No			CBT				D*	
CH-47D	2 ea. VHF, 2ea. FM radio, transponder	No	No			CBT				D*	
24 Electrical Power											
234	2 ea. 40 KVA generator on aft accessory gear box. No 1 and No. 2 Essential Bus and Emergency - Battery Bus. DC power controlled by switching in overhead panel cockpit.	No	No				AI			D*	
CH-47D	1 ea. 20 KVA generator on APU 1ea. 40 KVA on fwd and aft transmissions. DC power available automatic with AC available.	No	Yes				AI			D*	
25 Equipment/ Furnishings											
234	Passenger and Cargo configuration Single point cargo hook with electric and mechanical release in cockpit	No	No				AI			D*	
CH-47D	Cargo configuration and mission essential crew Triple point cargo hook with electric and mechanical release in cockpit	No	Yes				AI			D*	

DESIGN		REMARKS										FLT CHAR	PROC CHNG	3 <sup>rd</sup> Crew	LVL A	LVL B	LVL C	LVL D	LVL E	CHK	CURR		
26	Fire Protection																						
	234	Eng. Fire detection and suppression system control handles Janitrol Heater Fire Detection no suppression.										No	No				AI				D*		
	CH-47D	Eng. Fire detection and suppression system control handles and discharge switch. Janitrol Heater Fire Detection no suppression. Crewmember monitors heater compartment. APU Fire procedure – no suppression system. APU Fire – crewmember verification.										No	Yes	Yes			AI					D*	
27	Flight Controls																						
	234	Lower boost actuators servo controls and separate AFCS links. Nav. coupled.										No	No				AI				D*		
	CH-47D	Intergraded lower control unit (combined actuators and SAS system) Rotary control switch.										No	Yes				AI				D*		
28	Fuel																						
	234	Fuel Capacity 2,000 Gals. Note: 2 External Tanks removed. Two internal 500 Gals. Tanks installed. 2 fuel gauges and pressure gauge with shut off switches for refueling. One cross feed switch.										No	No				AI				D*		
	CH-47D	Fuel Capacity 2 Tanks @ 1,028 Gals. Up to 6 separate tanks. Fuel Management panel for cross feed and fuel tanks transfer controls.										No	Yes				AI				D*		
29	Hydraulic Power																						
	234	No. 1 and No.2 hyd. Flight boost pump driven by aft transmission AGB. Utility pump located on AGB. Emergency boost pump driven by aft transmission. Emergency Pump powers No. 1 hyd. System. Hyd. Hot annunciator lights. Hyd pressure gauges in cockpit. No. 1 and 2 hyd. Switches.										No	No				AI				D*		
	CH-47D	No. 1 hyd. Pump located fwd transmission. No. 2 located aft transmission. Utility pump located on aft transmission. Aux. pump driven by APU. Hyd. Pressure indicator lights in cockpit. Pressure, Temperature and quantity Gauges on aft. crewmember panel.										No	Yes	Yes			AI				D*		
30	Ice & Rain Protection																						
	234	Ice detector and blade deicing if installed, windshield wiper system										No	No		X								
	CH-47D	No flight into known icing conditions. windshield wiper system										No	No		X								
31	Instruments																						
	234	IFR certificated.										No	No				AI				D*		
	CH-47D	VFR certificated.										No	No				AI				D*		





DESIGN	REMARKS	FLT CHAR	PROC CHNG	3 <sup>rd</sup> Crew	LVL A	LVL B	LVL C	LVL D	LVL E	CHK	CURR
55 Stabilizers											
234	Not Applicable to model aircraft	No	No								
CH-47D	Not Applicable to CH-47D.	No	No								
56 Windows											
234	15 windows Left and Right side.	No	No			CBT					
CH-47D	5 windows Left and Right side. Jettison able for emergency exits.	No	No			CBT					
62 Main Rotors											
234	3 bladed articulated rotor system. Rotor Brake.	No	No								
CH-47D	3 bladed articulated rotor system.	No	No								
63 Main Rotor Drive											
234	Aft transmission, accessory gear box, combining transmission, No. 1 and 2 transmissions, fwd transmission, emergency gear pad, 7 drive shafts, and Aft vertical drive shaft. Transmission cooling located in aft pylon. Aux lubrication system. Failure Aux pressure light indicated in cockpit.	No	No				AI			D*	
CH-47D	Aft transmission, combining transmission, No. 1 and 2 transmissions fwd transmission, 7 drive shafts, and Aft vertical drive shaft. Transmission cooling integral to each fwd and aft transmission. Aux lubrication system. Failure Aux pressure light indicated in cockpit. Chip detection oil screen lights shown on crewmember maintenance panel.	No	Yes	Yes			AI			D*	
67 Rotors Flight Control											
234	Rotor head assembly fwd and aft actuators. Fwd Rotor rotation counterclockwise. Aft. Rotor rotation is clockwise.	No	No			CBT				B	
CH-47D	Rotor head assembly fwd and aft actuators. Fwd Rotor rotation counterclockwise. Aft. Rotor rotation is clockwise.	No	No			CBT				B	
71 Powerplant											
234	2 x AVCO Lycoming AL5512 (TC E4NE) Sea Level HP 2,975 each engine. TO 5 min. 4,075	No	No				AI			D*	
CH-47D	Honeywell T55-GA-714A Sea Level HP 4,866 each engine.	No	Yes				AI			D*	

DESIGN	REMARKS	FLT CHAR	PROC CHNG	3 <sup>rd</sup> Crew	LVL A	LVL B	LVL C	LVL D	LVL E	CHK	CURR
72 Turbine/Turbo Prop Engine											
234	N/A to model aircraft.										
CH-47D	N/A to model aircraft.										
73 Engine Fuel & Control											
234	Logic engine control. Specific start procedures. Manual process. Engine emergency control panel with guarded switching for manual and auto mode. Thrust lever switches engine trim active continuously.	No	No				AI			D*	
CH-47D	FADEC Automatic start process. Thrust lever switches engine trim active only emergency trim. Rheostat engine speed control. Power share by Torque or PTIT limits. Emergency procedures unique to FADEC.	No	Yes				AI			D*	
74 Ignition											
234	N/A to model aircraft.										
CH-47D	N/A to model aircraft.										
75 Air											
234	N/A to model aircraft.										
CH-47D	N/A to model aircraft.										
76 Engine Controls											
234	See box 73 Engine Fuel and Control										
CH-47D	See box 73 Engine Fuel and Control										
77 Engine Indicating											
234	Fuel Temperature Indicator. Engine Monitor Panel digital read out.	No	No			CBT				B	
CH-47D	Engine Fuel Flow Indicator.	No	Yes			CBT				B	

