U.S. Department of Transportation
Federal Aviation Administration
Washington, DC

Flight Standardization Board (FSB) Report

Revision: Original
Date: 04/18/2019

Manufacturer
Viking Air Limited

Type Certificate Data Sheet (TCDS)	TCDS Identifier	Marketing Name	Pilot Type Rating
A9EA as modified in accordance with Supplemental Type Certificate (STC) SA02682LA	DHC-6-300	Twin Otter	DHC-6HG

Approved by: Small Aircraft Branch
Federal Aviation Administration (FAA)
Aircraft Evaluation Division
901 Locust Street, Room 332
Kansas City, MO 64106

Telephone: (816) 329-3233
Fax: (816) 329-3241
Email: 9-AVS-AFS-100@faa.gov

TABLE OF CONTENTS

1. RECORD OF REVISIONS

Revision Number	Section(s)	Page(s)	Date
Original	All	All	04/18/2019

2. INTRODUCTION

Aircraft Evaluation Groups (AEG) are responsible for working with aircraft manufacturers and modifiers during the development and Federal Aviation Administration (FAA) certification of new and modified aircraft to determine: 1) the pilot type rating; 2) flightcrew member training, checking, and currency requirements; and 3) operational suitability.

This report lists those determinations for use by: 1) FAA employees who approve training programs; 2) FAA employees and designees who certify airmen; and 3) aircraft operators and training providers to assist them in developing their flightcrew member training, checking, and currency.

3. HIGHLIGHTS OF CHANGE

This is the original DHC-6-300HG™ Flight Standardization Board (FSB) report.

4. BACKGROUND

The Small Aircraft Branch formed an FSB that evaluated the DHC-6-300HG™. The normal category DHC-6-300 is defined in FAA Type Certificate Data Sheet (TCDS) #A9EA. The DHC-6-300HG™ is modified in accordance with FAA Supplemental Type Certificate (STC) SA02682LA.

FAA STC SA02682LA incorporates upgraded engines, upgraded propellers, increased maximum takeoff weights (MTOW), structural and aerodynamic modifications, and the aircraft category and design characteristics were updated to Title 14 of the Code of Federal Regulations (14 CFR) part 23 commuter category.

The evaluation was conducted during August 2018 using the methods described in the current edition of FAA Advisory Circular (AC) 120-53, Guidance for Conducting and Use of Flight Standardization Board Evaluations.

5. ACRONYMS

14 CFR	Title 14 of the Code of Federal Regulations
AC	Advisory Circular
ACFT	Aircraft
ACS	Airman Certification Standards
AEG	Aircraft Evaluation Group
AFMS	Airplane Flight Manual Supplement
AGL	Above Ground Level
ATP	Airline Transport Pilot
AV	Audiovisual Presentation
CPT	Cockpit Procedures Trainer
CRM	Crew Resource Management
FAA	Federal Aviation Administration
FFS	Full Flight Simulator
FSB	Flight Standardization Board
FSTD	Flight Simulation Training Device
FTD	Flight Training Device
GPS	Global Positioning System
HO	Handout
ICBI	Interactive Computer-Based Instruction
MDR	Master Differences Requirements
MTOW	Maximum Takeoff Weight
NAS	National Airspace System
PIC	Pilot in Command
PTS	Practical Test Standards
PTT	Part Task Trainer
SIC	Second in Command
SRM	Single Pilot Resource Management
STC	Supplemental Type Certificate
SU	Stand-Up Instruction
TCBI	Tutorial Computer-Based Instruction
TCDS	Type Certificate Data Sheet
V_1	Takeoff Decision Speed
V_2	Takeoff Safety Speed
V_{MCG}	Minimum Control Speed on the Ground with One Engine Inoperative
VNAV	Vertical Navigation
V_{SSE}	Intentional One Engine Inoperative Speed
V_{YSE}	Best Rate of Climb with One Engine Inoperative Speed
W&B	Weight and Balance

6. DEFINITIONS

These definitions are for the purposes of this report only.

6.1. Base Aircraft. An aircraft identified for use as a reference to compare differences with another aircraft.

6.2. Current. A crewmember meets all requirements to operate the aircraft under the applicable operating part.

6.3. Differences Tables. Describe the differences between a pair of related aircraft and the minimum levels operators must use to conduct differences training and checking of crewmembers. Difference levels range from A to E.

6.4. Master Differences Requirements (MDR). Specifies the highest training and checking difference levels between a pair of related aircraft derived from the Differences Tables.

6.5. Mixed Fleet Flying. The operation of a base aircraft and one or more related aircraft for which credit may be taken for training, checking, and currency events.

6.6. Operational Evaluation. An AEG process to determine pilot type rating, minimum crewmember training, checking, and currency requirements, and unique or special airman certification requirements (e.g., specific flight characteristics, no-flap landing).

6.7. Operational Suitability. An AEG determination that an aircraft or system may be used in the National Airspace System (NAS) and meets the applicable operational regulations (e.g., 14 CFR parts 91, 121, 133, 135).

6.8. Qualified. A crewmember holds the appropriate airman certificate and ratings as required by the applicable operating part.

6.9. Related Aircraft. Any two or more aircraft of the same make with either the same or different type certificates that have been demonstrated and determined by the Administrator to have commonality.

6.10. Seat Dependent Tasks. Maneuvers or procedures using controls that are accessible or operable from only one flightcrew member seat.

6.11. Special Emphasis Area. A training requirement unique to the aircraft, based on a system, procedure, or maneuver, which requires additional highlighting during training. It may also require additional training time, specialized training devices, or training equipment.

6.12. Specific Flight Characteristics. A maneuver or procedure with unique handling or performance characteristics that the FSB has determined must be checked.

7. PILOT TYPE RATING

7.1. Type Rating.

7.1.1 The Twin Otter DHC-6-300HG™ type rating designation is DHC-6HG and may be operated with or without a second in command (SIC) with certain limitations. The Airplane Flight Manual Supplement (AFMS) lists equipment that must be installed and operative to operate the aircraft single pilot.

7.1.2 A DHC-6HG pilot type rating may be issued with the limitation "DHC-6HG Second in Command Required" when a pilot satisfactorily completes the type rating practical test while utilizing a SIC as a crewmember.

7.2. Common Type Ratings. Not applicable.

7.3. Military Equivalent Designations. Military aircraft that qualify for the DHC-6-300HG™ can be found on the faa.gov website under Licenses and Certificates, Airmen Certification, Online Services, Aircraft Type Rating Designators. This webpage is kept up-to-date and can be found at http://www.faa.gov/licenses_certificates/airmen_certification.

8. RELATED AIRCRAFT

8.1. Related Aircraft on Same TCDS. Not applicable.

8.2. Related Aircraft on Different TCDS. Not applicable.

9. PILOT TRAINING

9.1. Airman Experience.

Airmen receiving initial Twin Otter DHC-6-300HG™ training should hold at least a private pilot airplane, multi-engine land certificate with an instrument airplane rating. Pilots without this experience may require additional training.

9.2. Special Emphasis Areas.

Pilots must receive special emphasis on the following areas during ground and flight training (initial, recurrent, and upgrade training):

9.2.1 Taxiing the aircraft to include nose wheel steering tiller usage.

9.2.2 Single Pilot Resource Management (SRM)/Crew Resource Management (CRM) associated with single and dual pilot operations (as applicable).

9.2.3 Integrated use of the autopilot (if installed), including knowledge of selectable functions, capabilities, and airspeed limitations.

9.2.4 Global Positioning System (GPS) (if equipped) and ground-based navigation information must be understood to safely and reliably operate the aircraft during instrument approaches, including the use of vertical navigation (VNAV) functions.

9.2.5 Crosswind landing techniques at or near maximum demonstrated crosswind components.

9.2.6 Weight and Balance (W&B) calculations and center of gravity computations.

9.2.7 Supplemental operating limitations and procedures.

9.2.8 V speeds familiarity to include takeoff safety speed (V_2) (same as best rate of climb with one engine inoperative speed (V_{YSE}) or blue line)

9.2.9 Rejected takeoffs. Rejected takeoffs must be demonstrated and practiced during training sessions. For additional safety margin, the rejected takeoff speed should not be greater than 30 knots, which is 50 percent of minimum control speed on the ground with one engine inoperative (V_{MCG}).

9.2.10 Crew monitoring of the maximum allowable oil temperature transient limitation.

9.2.11 Go-arounds in various landing flap configurations.

9.2.12 Landing with sufficient thrust until touchdown to prevent hard landings.

9.2.13 Simulated engine failure after takeoff. The failure of the most critical powerplant should be simulated, giving consideration to airspeed awareness and airspeed control, local atmospheric conditions, terrain, and aircraft performance.

9.2.14 Visual approach with full flaps to a go-around. A go-around from a full-flap landing requires more airspeed and pitch control than a go-around with a flap setting less than full flaps. More thrust may be required until touchdown than normal with full flaps.

9.3. Specific Flight Characteristics.

Maneuvers/procedures required to be trained as referenced in the airline transport pilot (ATP) and type rating practical test standards (PTS) or Airman Certification Standards (ACS), as applicable.

Visual approach with full flaps to a go-around:

- During approach to landing with full flaps, the flight deck angle is significantly lower than the flight deck angle during approach and landing with other flap settings.
- With full flaps, the roll forces through the control yoke are significantly higher than the roll forces with other flap settings.
- Any pitch attitude greater than 0 degrees during the go-around maneuver with full flaps may cause a rapid decrease in airspeed and possible stall.

- When power is applied during the go-around with full flaps, the aircraft will have an unusual pitch down attitude until flaps are retracted.
- A go-around from an approach to landing with full flaps should be conducted no lower than 200 feet above ground level (AGL) and at or below half the maximum demonstrated crosswind.
- Training for the full flap go-around will utilize the ATP and type rating PTS or ACS; rejected landing task objectives with the above stated altitude limitation and a minimum descent rate of 800 feet per minute.

9.4. Seat Dependent Tasks.

Pilots must receive training in these seat dependent tasks during initial, recurrent, and upgrade training:

9.4.1 Taxiing and ground handling from the left seat is required for pilot in command (PIC) training (single or crew) due to nose wheel steering tiller location.

9.5. Regulatory Training Requirements which are Not Applicable to the DHC-6-300HG™.

None.

9.6. Flight Simulation Training Devices (FSTD).

There are no specific systems, procedures, or maneuvers that are unique to the Twin Otter DHC-6-300HG™ that require a specific FSTD for training.

9.7. Training Equipment.

There are no specific systems or procedures that are unique to the Twin Otter DHC-6-300HG™ that require specific training equipment.

9.8. Differences Training between Related Aircraft.

Not applicable.

10. PILOT CHECKING

10.1. Landing from a No-Flap or Nonstandard Flap Approach.

The probability of flap extension failure on the DHC-6-300HG™ is not extremely remote due to system design. Therefore, demonstration of a nonstandard flap approach and landing during pilot certification or a 14 CFR part 61, § 61.58 proficiency check, part 91, § 91.1065 competency check, or part 135, § 135.293 competency check is required. Refer to FAA Order 8900.1, Volume 5 when the test or check is conducted in an aircraft versus a full flight simulator (FFS). A no-flap landing is not required because there is no performance data available in the AFMS that supports a no-flap landing. A nonstandard flap approach is considered to be conducted with flaps set to 10 degrees.

10.2. Specific Flight Characteristics.

Maneuvers/procedures required to be checked as referenced in the ATP and type rating PTS or ACS, as applicable.

Visual approach with full flap to a go-around:

- During approach to landing with full flaps, the flight deck angle is significantly lower than the flight deck angle during approach and landing with other flap settings.
- With full flaps, the roll forces through the control yoke are significantly higher than the roll forces with other flap settings.
- Any pitch attitude greater than 0 degrees during the go-around maneuver with full flaps may cause a rapid decrease in airspeed and possible stall.
- When power is applied during the go-around with full flaps, the aircraft will have an unusual pitch down attitude until flaps are retracted.
- A go-around from an approach to landing with full flaps should be conducted no lower than 200 feet AGL and at or below half the maximum demonstrated crosswind.
- A minimum of 800 feet per minute descent rate should be initiated to evaluate this maneuver.
- Evaluation of the full flap go-around will utilize the ATP and type rating PTS or ACS; rejected landing task with the above stated altitude limitation.

10.3. Seat Dependent Tasks.

Pilots must be checked in these seat dependent tasks during initial, recurrent, and upgrade training:

10.3.1 Taxiing and ground handling from the left seat is required for PIC checking (single or crew) due to nose wheel steering tiller location.

10.4. Other Checking Items.

Simulated engine failure after takeoff. Although the testing standard communicates the simulated engine failure after takeoff be accomplished after takeoff decision speed (V_1) and prior to V_2, it is recommended that for evaluation this maneuver not be conducted below 400 feet AGL. The failure of the most critical powerplant should be simulated at intentional one engine inoperative speed (V_{SSE}) by smoothly reducing the simulated engine failed throttle until simulated zero thrust is set. The autofeather system must be selected ON for takeoff and with flaps set to 10 degrees.

10.5. FSTDs

There are no specific systems, procedures, or maneuvers that are unique to the Twin Otter DHC-6-300HG™ that require a specific FSTD for checking.

10.6. Equipment.

There are no specific systems or procedures that are unique to the Twin Otter DHC-6-300HG™ that require specific equipment.

10.7. Differences Checking between Related Aircraft.

Not applicable.

11. PILOT CURRENCY

There are no additional currency requirements for the Twin Otter DHC-6-300HG™ other than those already specified in parts 61 and 135.

11.1. Differences Currency between Related Aircraft.

Not applicable.

12. OPERATIONAL SUITABILITY

The Twin Otter DHC-6-300HG™ is operationally suitable for operations under parts 91 and 135. The FSB determined operational compliance by conducting an evaluation of aircraft serial number 499 on 08/15/2018. The list of operating rules evaluated is on file at the Small Aircraft Branch.

13. MISCELLANEOUS

13.1. Forward Observer Seat.

No forward observer seat was evaluated.

13.2. Landing Minima Categories (Reference 14 CFR Part 97, § 97.3).

The DHC-6-300HG™ is considered Category B aircraft for the purposes of determining "straight-in landing weather minima".

13.3. Normal Landing Flaps.

The DHC-6-300HG™ normal "final landing flap setting" per § 91.126(c) is 20 degrees.

APPENDIX 1. DIFFERENCES LEGEND

Training Differences Legend

Differences Level	Type	Training Method Examples	Conditions
A	Self-Instruction	• Operating manual revision (HO) • Flightcrew operating bulletin (HO)	• Crew has already demonstrated understanding on base aircraft (e.g., updated version of engine). • Minor or no procedural changes required. • No safety impact if information is not reviewed or is forgotten (e.g., different engine vibration damping mount). • Once called to attention of crew, the difference is self-evident.
B	Aided Instruction	• Audiovisual presentation (AV) • Tutorial computer-based instruction (TCBI) • Stand-up instruction (SU)	• Systems are functionally similar. • Crew understanding required. • Issues need emphasis. • Standard methods of presentation required.
C	Systems Devices	• Interactive (full-task) computer-based instruction (ICBI) • Cockpit procedures trainers (CPT) • Part task trainers (PTT) • Level 4 or 5 flight training device (FTD 4–5)	• Training can only be accomplished through systems training devices. • Training objectives focus on mastering individual systems, procedures, or tasks versus highly integrated flight operations or “real-time” operations. • Training devices are required to assure attainment or retention of crew skills to accomplish more complex tasks usually related to aircraft systems.
D	Maneuvers Devices	• Level 6 or 7 flight training device (FTD 6–7) • Level A or B full flight simulator (FFS A–B)	• Training can only be accomplished in flight maneuver devices in a real-time environment. • Training requires mastery of interrelated skills versus individual skills. • Motion, visual, control loading, and specific environmental conditions may be required.
E	Level C/D FFS or Aircraft	• Level C or D full flight simulator (FFS C–D) • Aircraft (ACFT)	• Motion, visual, control loading, audio, and specific environmental conditions are required. • Significant full task differences that require a high fidelity environment. • Usually correlates with significant differences in handling qualities.

Checking Differences Legend

Differences Level	Checking Method Examples	Conditions
A	None	None
B	• Oral or written exam • Tutorial computer-based instruction self-test (TCBI)	• Individual systems or related groups of systems.
C	• Interactive (full-task) computer-based instruction (ICBI) • Cockpit procedures trainers (CPT) • Part task trainers (PTT) • Level 4 or 5 flight training device (FTD 4–5)	• Checking can only be accomplished using systems devices. • Checking objectives focus on mastering individual systems, procedures, or tasks.
D	• Level 6 or 7 flight training device (FTD 6–7) • Level A or B full flight simulator (FFS A–B)	• Checking can only be accomplished in flight maneuver devices in a real-time environment. • Checking requires mastery of interrelated skills versus individual skills. • Motion, visual, control loading, and specific environmental conditions may be required.
E	• Level C or D full flight simulator (FFS C–D) • Aircraft (ACFT)	• Significant full task differences that require a high fidelity environment.

APPENDIX 2. MASTER DIFFERENCES REQUIREMENTS (MDR) TABLE

Not applicable.

APPENDIX 3. DIFFERENCES TABLES

Not applicable.