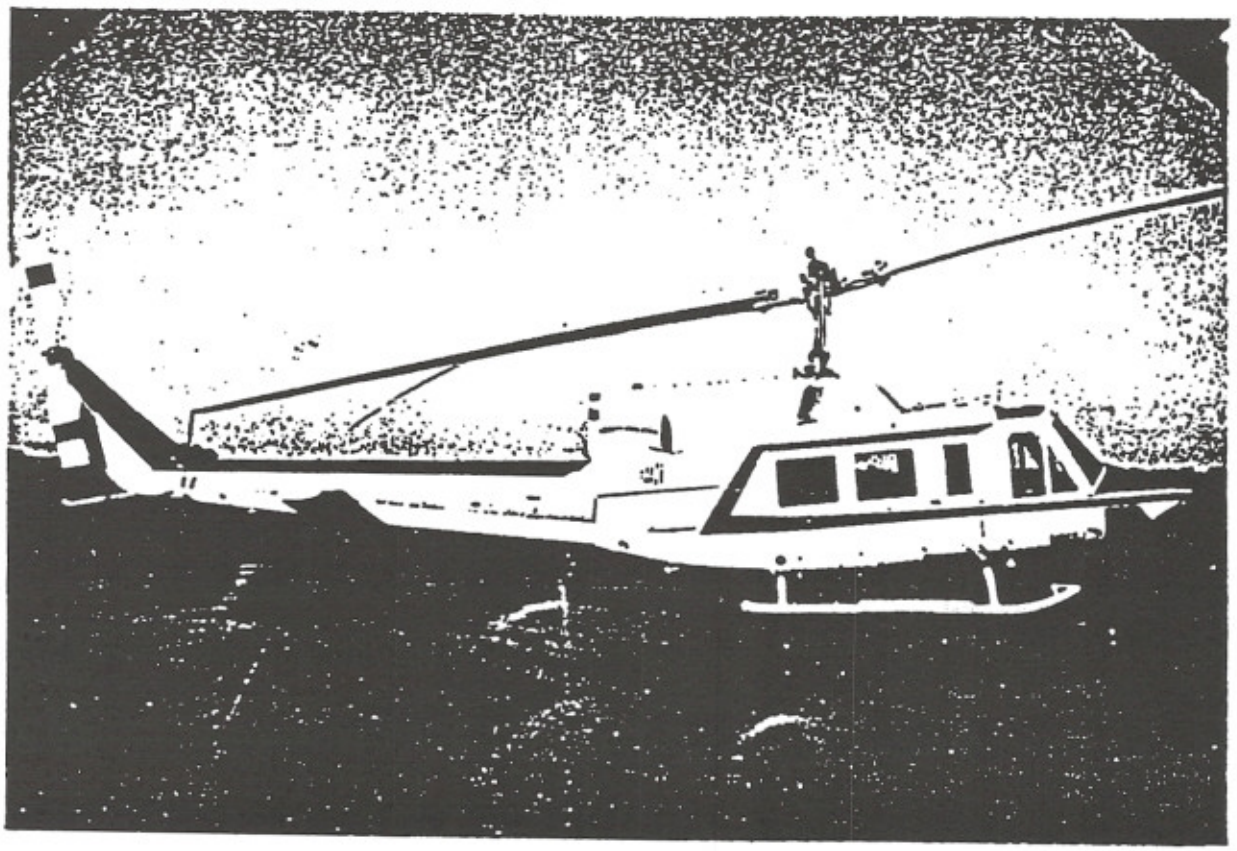
2 GENERAL DESCRIPTION

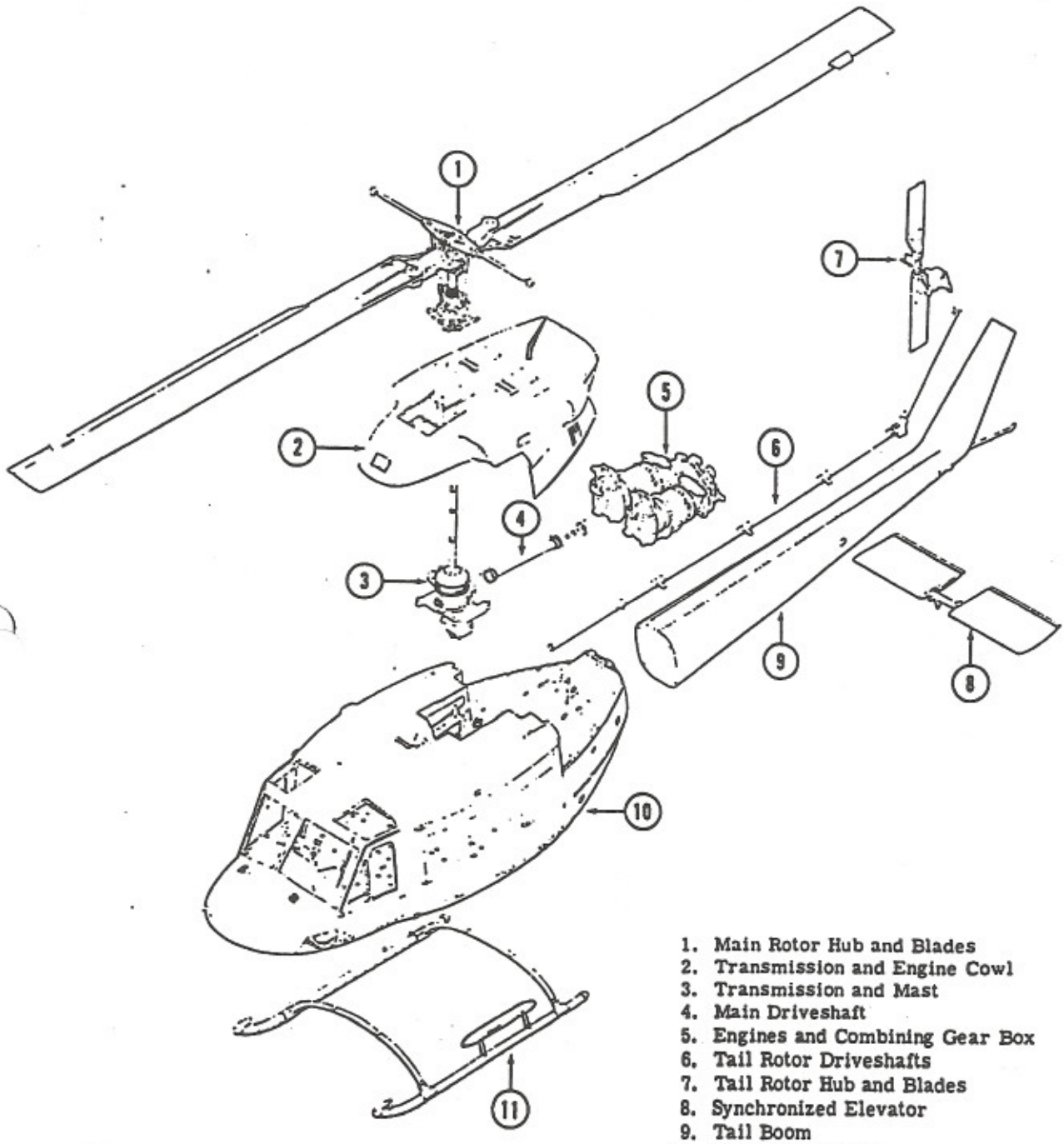


MODEL 212

GENERAL DESCRIPTION

The Bell Helicopter Model 212 is a 15 place twin jet-turbine powered helicopter designed for high performance, low maintenance and maximum versatility. The single main rotor and anti-torque rotor are semi-rigid, two-bladed type with an underslung feathering axis. The helicopter is powered by a Pratt & Whitney PT6T-3 engine manufactured in Canada. The 1800 SHP engine is flated rated to 1290 SHP.

The crew compartment contains provisions for a pilot and co-pilot with dual presentations of all flight and navigational instruments. Engine and powertrain instruments are grouped in the center of the instrument panel for easy observation by either pilot/co-pilot. An overhead console and pedistal console is mounted between the two pilot stations .



1. Main Rotor Hub and Blades
2. Transmission and Engine Cowl
3. Transmission and Mast
4. Main Driveshaft
5. Engines and Combining Gear Box
6. Tail Rotor Driveshafts
7. Tail Rotor Hub and Blades
8. Synchronized Elevator
9. Tail Boom
10. Forward Fuselage
11. Landing Gear

Model 212 Major Components

AIRFRAME

The fuselage consists of two main sections, the forward section and the aft or tail boom section. The cabin has accommodations for 15 seats, including the pilot and copilot. Seating positions are in a two-four-, and five-passenger arrangement, with the pilot and copilot in the forward location. Optional interiors are available for the Model 212 helicopter to meet the requirements for personal, executive or utility transport operations. The interiors can be customized as desired by the customer. Conversion from passenger to cargo configuration is easily accomplished by removal of the seats. Without seats, the cabin afford approximately 220 cubic feet of cargo space.

The helicopter's landing gear is a skid type gear that will permit operation from almost any ground surface. Two manually retractable and quickly removable wheel assemblies (provided in the loose equipment) are attached to permanently installed fittings on the skid gear when needed for ground handling operations. A tubular steel tail skid is attached to the lower aft section of the tail boom to protect the tail rotor in case of a tail-low landing.

POWERPLANT

The powerplant is a PT6T-3 Twin-Pac installation, consisting of two identical power sections and a common reduction gear box. The power sections drive the output shaft to the transmission through separate reduction gear trains in the combining gear box. Each power section has a free-wheeling unit to disengage an inoperative power section allowing the operating engine to power the helicopter. The PT6T-3 Twin-Pac provides automatic torque sharing and torque limiting.

POWERTRAIN

The powertrain is a system of drive shafts and gear boxes which transmits power from the engine to the main rotor and tail rotor. Principal components are the main drive shaft, transmission, main rotor mast, six tail rotor drive shafts with hanger assemblies, forty two degree gear box and a ninety degree gear box. The transmission provides a 20.37 to 1 reduction ratio between the engine and the main rotor. The transmission incorporates a free-wheeling unit, at the input quill, to provide a disconnect in the event of a power failure. The transmission also provides a takeoff for the tail rotor drive system and accessory mounting pads for the two hydraulic pumps, tachometer generator and rotor brake, if installed. The hydraulic pumps, being transmission driven, would supply hydraulic power to all flight controls in the event of a dual engine failure, requiring an autorotational landing.

MAIN ROTOR GROUP

The main rotor is a two-bladed, semi-rigid, see-saw, high kinetic energy type, with preconing and underslinging capabilities to increase stability and provide smooth control response in all modes of flight. The rigidity of the blade-hub unit eliminates ground resonance, and the high energy associated with the system allows accomplishment of easy-to-perform, safe autorotational landings in case of power failure. A stabilizer bar is connected into the main rotor system in such a manner that the inherent inertia and gyroscopic action of the bar is introduced into the rotor system and provides a measure of stability for all flight conditions.

TAIL ROTOR GROUP

The tail (anti-torque) rotor counteracts the torque of the main rotor and functions to maintain or change the helicopter's heading. The tail rotor is controlled by linkage from the pilot's directional control pedals through a pitch control mechanism. The pitch control mechanism increases or decreases the pitch of the tail rotor blades to the required setting in order to maintain directional control.

FLIGHT CONTROLS

The helicopter utilizes standard mechanical linkage flight controls with hydraulic boost. The mechanical linkage systems include a cyclic control stick for fore-aft and lateral control, a collective pitch control stick for vertical control, and tail rotor pedals for directional control. A synchronized elevator is linked to the fore-aft cyclic control system to provide increased controllability and lengthen the center of gravity range. The mechanical flight control systems incorporate flight control coupling to automatically induce corrective compensation into the cyclic and directional controls as a function of collective pitch change. As a result, the pilot's work load is greatly reduced when making power changes.

FUEL SYSTEM

The fuel supply is contained in five separate fuel cells. The three aft upper cells supply fuel to the two lower main cells. During normal operation the two lower main cells and their respective pressure systems are completely separate and independent of each other. Interconnect lines, with cockpit controlled valves, connect the two lower main cells to allow gravity flow of fuel between the two systems. Crossfeed lines with an automatically operated valve, connect the two pressure systems allowing either system fuel boost pump to supply pressure fuel to either or both engines. The system is serviced at a single point on the right side of the helicopter and contains defueling provisions and electrically operated drain valves.

Built-in connections are provided for use with either of tw auxiliary fuel kits available as optional equipment.

HYDRAULIC SYSTEM

The main rotor cyclic and collective dual servo actuators are powered by two separate and independent gravity feed hydraulic systems, System #1 and System #2. The directional servo is powered by System #1 only. The dual hydraulic systems provide boost power to reduce the operational loads on the flight control systems and provides hydraulic power to the SCAS servo actuators of the Automatic Flight Control System (AFCS). The hydraulic pumps are mounted on and driven by the transmission so that the pumps will continue to supply hydraulic power for the flight controls in case of total powerplant failure.

ELECTRICAL POWER SYSTEM

The electrical system is a 28 volt D.C. single conductor syst with the negative load connected to common which is the aircraft structure. D.C. power is supplied by the generator portion of the two starter-generators operating in parallel feed two main busses, two essential busses and one non-essential D.C. bus. A 24 volt 34 ampere nickel cadium battery can suppl any or all busses if both generators fail. Three 250 volt-amp solid state inverters supply 115 volts A.C., single phase, 400 hertz power to the five A.C. busses; three 115 volt busses and two 26 volt A.C. busses for instruments.

AUTOMATIC FLIGHT CONTROL SYSTEM

The Automatic Flight Control System (AFCS) installed in the BHC Model 212 IFR helicopter has two basic modes of operation stability, control augmentation (SCAS) and attitude retention. The augmentation (SCAS) mode is effective about the roll, pitch and yaw axes and provides precise response characteristi to maneuvering commands while creating an airframe which is highly dampened to external disturbances. The attitude retention mode provides three-axis stabilization and provides a fly-through capability.

AVIONICS

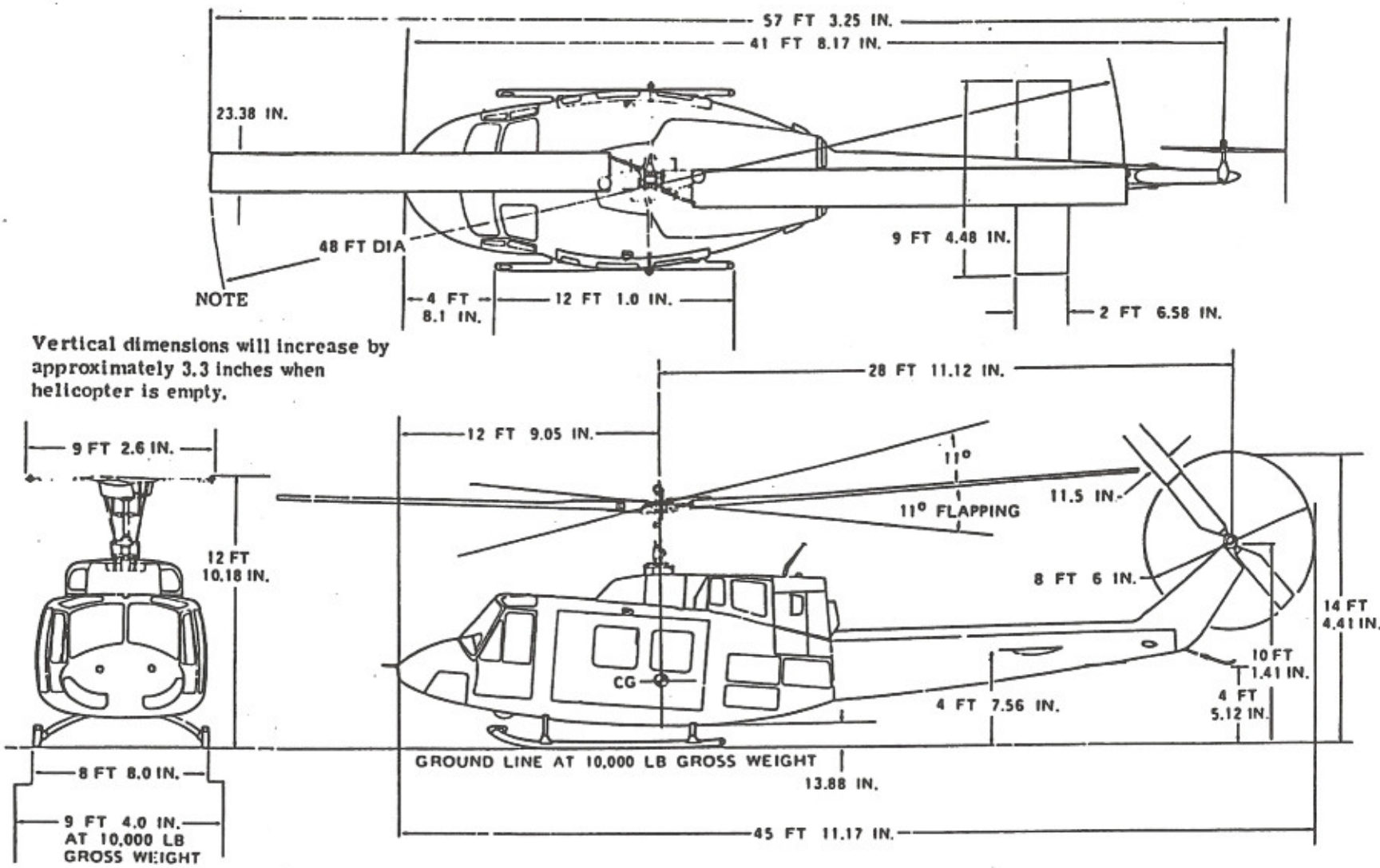
The avionics communication and navigational systems installed in the Model 212 IFR helicopter, as standard equipment, exceed those required for Category 1 flight operations. The communications system include an intercommunications system and dual VHF communication radio's. The navigational systems include dual VHF/VOR/LOC navigational radio's, ADF (Automatic Directio Finder) with marker beacon, DME (Distance Measuring Equipment)

and transponder. Navigational display's are presented for the pilot and co-pilot on dual ADI's (Attitude Direction Indicator) and HSI's (Horizontal Situation Indicator). Through HSI Controllers all navigational presentations can be displayed on either or both HSI indicator's.

UTILITY SYSTEMS

The utility systems include the pitot static system, ventilating system, bleed-air heating system, fire detection and extinguisher systems, pilot/co-pilot winshield wiper installation and the installed cargo suspension cables and wiring.

Notes


57 FT 3.25 IN.
41 FT 8.17 IN.
23.38 IN.
48 FT DIA
NOTE
9 FT 4.48 IN.
4 FT 8.1 IN.
12 FT 1.0 IN.
2 FT 6.58 IN.
Vertical dimensions will increase by approximately 3.3 inches when helicopter is empty.
28 FT 11.12 IN.
12 FT 9.05 IN.
9 FT 2.6 IN.
11°
11° FLAPPING
11.5 IN.
12 FT 10.18 IN.
8 FT 6 IN.
14 FT 4.41 IN.
10 FT 1.41 IN.
CG
4 FT 7.56 IN.
4 FT 5.12 IN.
GROUND LINE AT 10,000 LB GROSS WEIGHT
13.88 IN.
8 FT 8.0 IN.
9 FT 4.0 IN. AT 10,000 LB GROSS WEIGHT
45 FT 11.17 IN.

GENERAL CHARACTERISTICS

General data pertinent to the 212 are summarized as follows:

1. Airframe

Over-all length (rotor turning)	57' 3.25"
Fuselage length (T/R Horizontal)	45' 11.17"
Width (Rotor Fore & Aft)	9' 4.48"
Height (T/R Horizontal)	12' 10.18"
Landing Gear Tread (No Load)	8' 8.0 "

2. Main Rotor

Number of blades	2
Diameter	48'
Chord	21" extending to 23.38"
Twist	-10°
Airfoil section	Symmetrical with last 20% of blade being tapered.
Engine to rotor gear ratio	20.37:1
Tip speed (100% Rotor RPM)	814 Fps.

3. Tail Rotor

Number of blades	2
Diameter	8' 6"
Chord	0' 11.5"
Twist	0°

4. Engine

Model No.	PT6T-3
Manufacturer	United Aircraft of Canada Limited
Max. continuous power (SHP)	1600
Normal RPM	6600 = 100%
Takeoff power (SHP) 5 min	1800
Power section (SHP) ea. 30 min	900

5. Transmission Rating

Max. continuous power (SHP)	1135
Takeoff power (5 min.) (SHP).	1290

General Characteristics (continued)

6. Weights

FAA Empty Weight	5800 lbs.
Maximum Gross Weight	11,200 lbs.

7. Seating

Crew	1
Passengers	14

8. Fuel (without auxiliary tanks)

Capacity, usable	1409 Pounds 217 U.S. Gal.

9. Oil (Engine)

Capacity-Engine, Each (2)	1.6 US Gals.
-Combining Gearbox	1.25 US Gals.
Total	4.45 US Gals.
Type MIL-L-7808E or MIL-L-23699	

10. Oil (Transmission)

Capacity	2.75 U. S. Gallons
Type	(MIL-L-7808/23699

11. Cargo Area

Length (over-all)	7' 8"
Width (floor level)	8' 0"
Height (maximum)	4' 4"

12. Usable Cubage

Main cargo space	220 cu. ft.
Left side passenger seat space	20 cu. ft.
Baggage compartment space	28 cu. ft.

13. Cargo Door Opening

Height	4' 1"
Width (with hinged panel open)	7' 8"
Height above ground (approx.)	2' 6"

14. Allowable Center of Gravity Travel

Fore and Aft	14 inches
Lateral	4.7 Left - 6.5 Right

15. Climate Operating Conditions -54°c to 51.5°c

General Characteristics (continued)

Maximum airspeed (Vne)	130 Kts. Sea Level to 3000'
Decrease (Vne)	3 Kts/1000' Above 3000'
Minimum front seat total weight	170 lbs.

Satisfactory stability and control in rearward and sideward flight has been demonstrated for speeds up to and including 30 kts.

Notes