SECTION 5

PERFORMANCE

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SECTION 5

PERFORMANCE

GENERAL

Hover controllability has been substantiated in 17 knot wind from any direction up to 11,000 feet (3350 meters) density altitude. Refer to hover performance charts for allowable gross weight.

CAUTION

Performance data presented in this section was obtained under ideal conditions. Performance under other conditions may be substantially less.

Indicated airspeed (KIAS) shown on charts assumes zero instrument error.

USE OF CHARTS

DENSITY ALTITUDE CHART

Aerodynamic performance of a helicopter rotor system is greatly affected by air density, usually stated as density altitude. Density altitude can be read from the chart using known pressure altitude and temperature. For example, the helicopter altitude limit is 14,000 feet density altitude and maximum temperature limit is ISA + 35°C. The chart shows that 14,000 feet density altitude is over 16,000 feet pressure altitude at –40°C but only 10,200 feet pressure altitude at maximum ambient temperature of 30°C.

V_{ne} tables in Section 2 indicate "no flight" for altitude/temperature combinations which exceed 14,000 feet density altitude or ISA + 35°C limits. Note that the actual maximum allowable temperature at a given altitude may be greater than what is given in the tables. For example, the Density Altitude Chart shows maximum allowable temperature at 2,000 feet pressure altitude is 46°C. V_{ne} at this condition may be estimated by extrapolation from the table.

USE OF CHARTS (cont'd)

POWER ASSURANCE CHART

The power assurance chart shows maximum allowable MGT at a specified torque. If observed MGT is greater than indicated by the chart, the engine may not be producing the power necessary to achieve the performance data given in this section without exceeding MGT limits.

A power assurance check may be done in a hover or in forward flight and should be performed at the maximum practical power for best accuracy. The chart assumes no generator load and stabilized conditions. Temperature stabilization may take up to two minutes. Generator load should be minimal or the generator may be switched OFF during the check. An example on the chart shows correct use.

The chart may also be read in reverse, giving the minimum allowable torque at a specified MGT. It may be useful to use the chart to predict the torque available at MGT limits for a given pressure altitude and OAT.

HOVER PERFORMANCE

In-ground-effect (IGE) and out-of-ground-effect (OGE) hover performance is given in the Hover Ceiling vs. Gross Weight charts on pages 5-7 and 5-8, respectively. Note that hover performance is limited by the MGT five-minute limit, not by torque or tail rotor authority. Hover performance is substantiated up to 11,000 feet (3350 meters) density altitude; however, data is presented beyond 11,000 feet density altitude only to determine performance with engine anti-ice, cabin heat, and/or generator loads over 50 amps. With anti-ice and cabin heat OFF, maximum IGE hover gross weight is 2700 lb (1225 kg) up to 11,000 feet density altitude at any OAT within limits.

To correct for anti-ice, cabin heat, and/or high generator load, increase the actual OAT as specified on the charts. The following example illustrates the calculation of an effective OAT when anti-ice and cabin heat are turned ON, and there is a 90-amp generator load (40 amps over the 50-amp load on which the charts are based):

USE OF CHARTS (cont'd)

HOVER PERFORMANCE (cont'd)

Pressure altitude:	9000 ft
Actual OAT:	0°C
Anti-ice ON correction:	10°C
Cabin heat ON correction:	20°C
90-amp load correction	(90-50)/20 = 2°C
Effective OAT:	0 + 10 + 20 + 2 = 32°C

9000 ft pressure altitude and 32°C OAT are therefore used with the charts, giving a maximum weight of 2580 lb (1170 kg) for IGE hover and 2320 lb (1050 kg) for OGE hover.

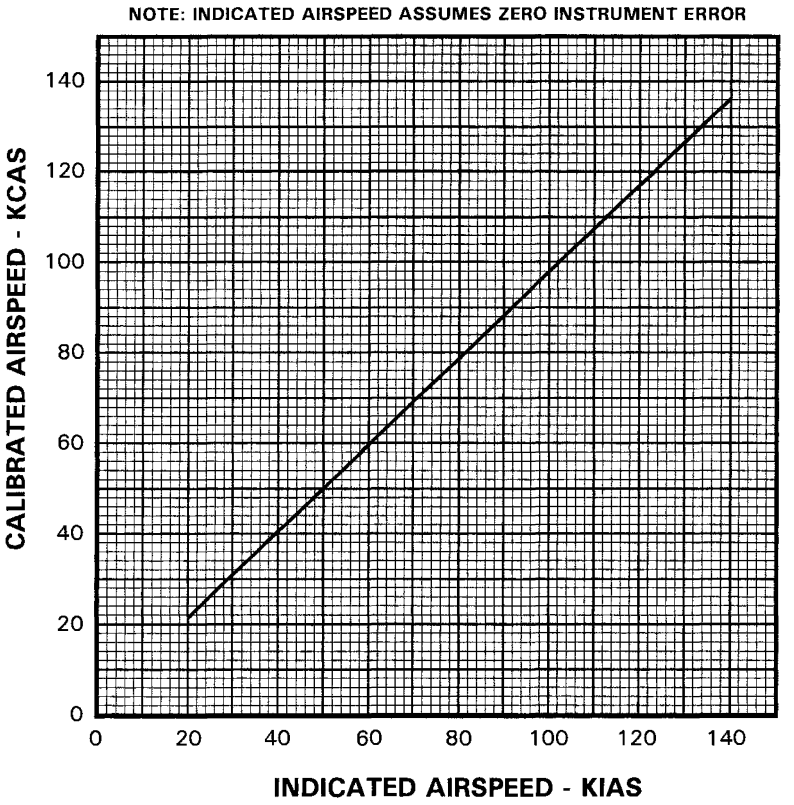
If wind is present, subtract an additional 100 lb (45 kg) IGE and 50 lb (23 kg) OGE per note on chart. This provides a power margin for transient control inputs up to 17 knot wind regardless of azimuth.

CLIMB PERFORMANCE

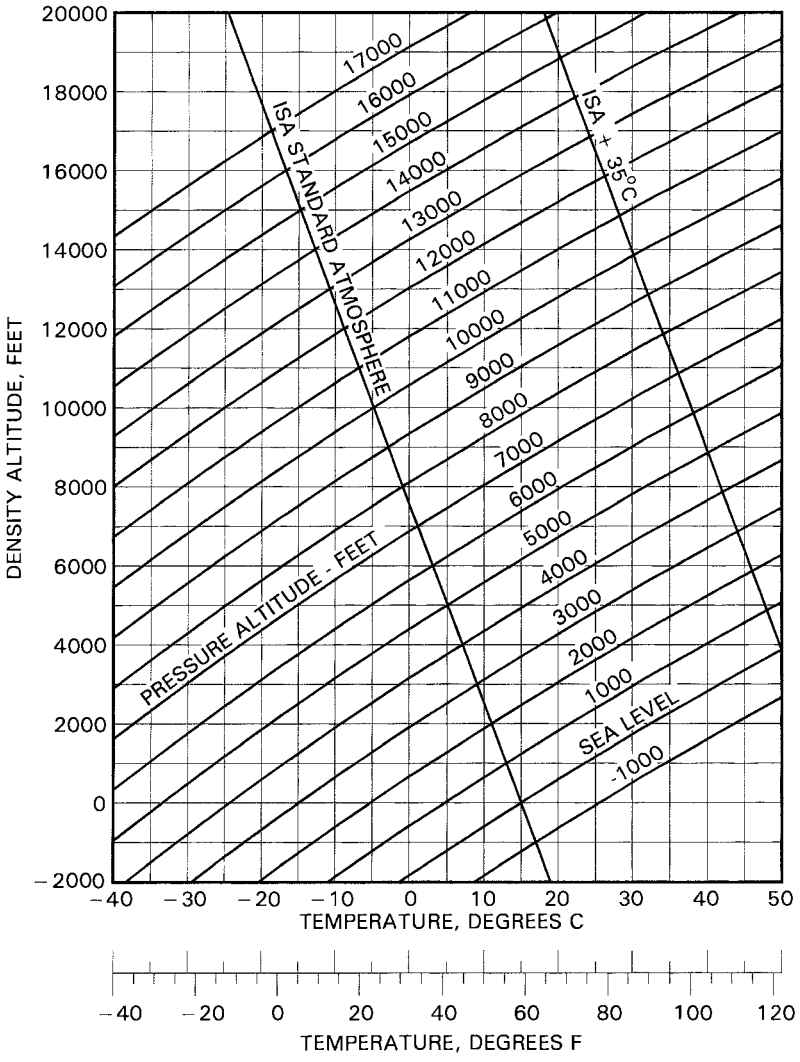
Climb performance charts are given for 2700 lb (1225 kg) and 2200 lb (998 kg) gross weight at 60 KIAS climb speed and maximum continuous torque or MGT (whichever is less). Each chart gives the potential reduction in climb rate due to anti-ice and cabin heat. The charts assume a 50-amp generator load; generator load has only a small effect on climb rate. Note that predicted climb rate is approximate; variations in aircraft and operating conditions may significantly affect performance.

HIGH-VELOCITY DIAGRAM

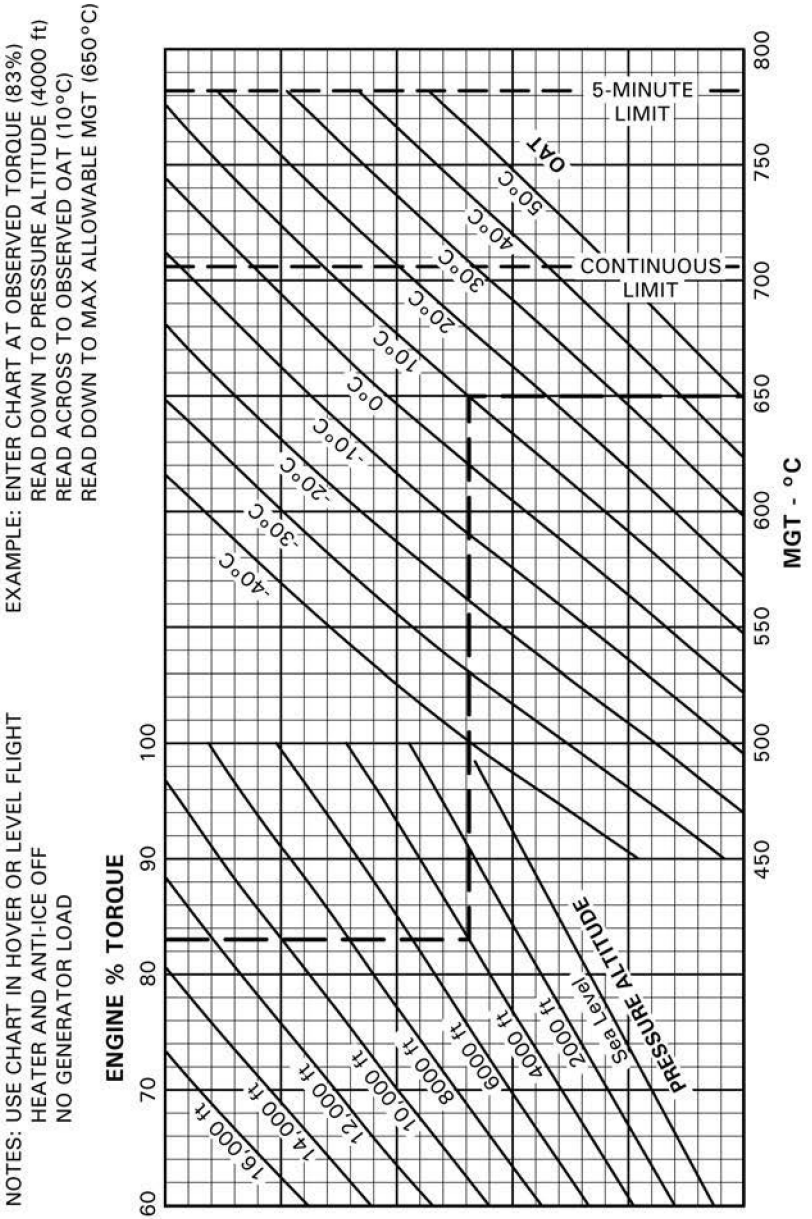
The height-velocity diagram is given for maximum gross weight at sea level and at 7800 feet (2380 meters) density altitude. An appropriate line for altitudes between sea level and 7800 feet may be estimated by interpolation. For example, a line with a hover point at 600 feet AGL may be used for 3900 feet density altitude.



AIRSPEED CALIBRATION CURVE

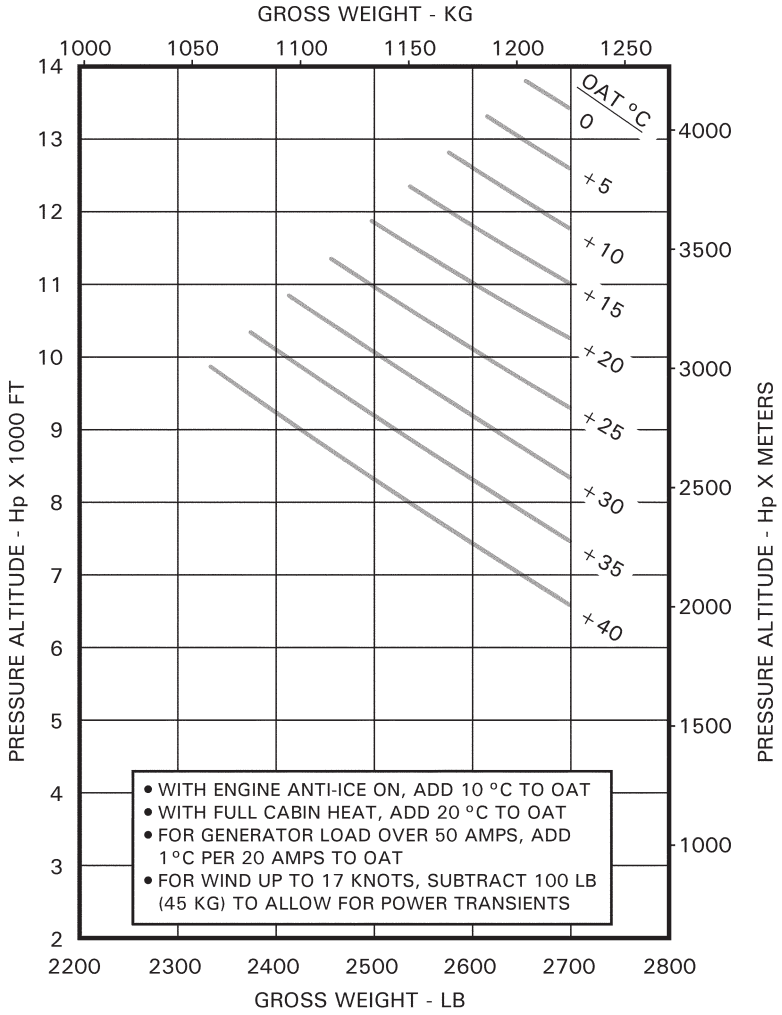


DENSITY ALTITUDE CHART



POWER ASSURANCE CHART

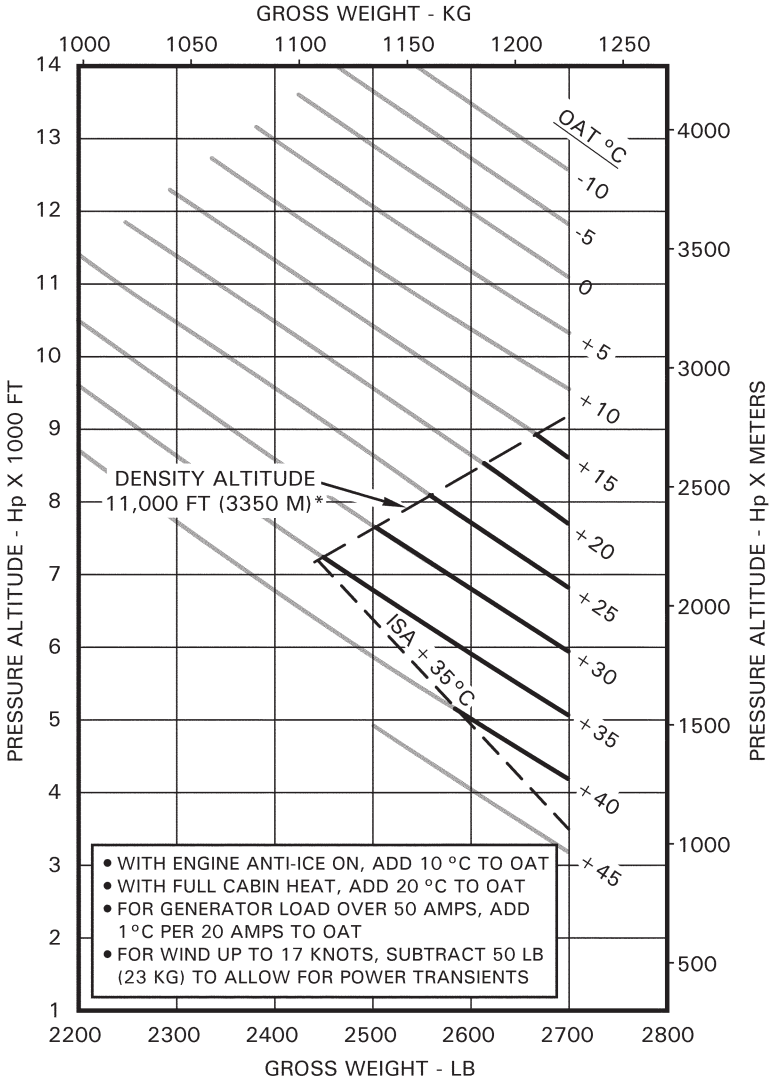
IN GROUND EFFECT AT 2 FOOT SKID HEIGHT AND ZERO WIND
MGT 5-MINUTE LIMIT
ENGINE ANTI-ICE AND CABIN HEAT OFF
50 AMP GENERATOR LOAD



IGE HOVER CEILING VS. GROSS WEIGHT

NOTE: Hover performance substantiated up to 11,000 feet (3350 meters) density altitude. Data is presented only to determine performance with engine anti-ice, cabin heat and/or generator loads over 50 amps.

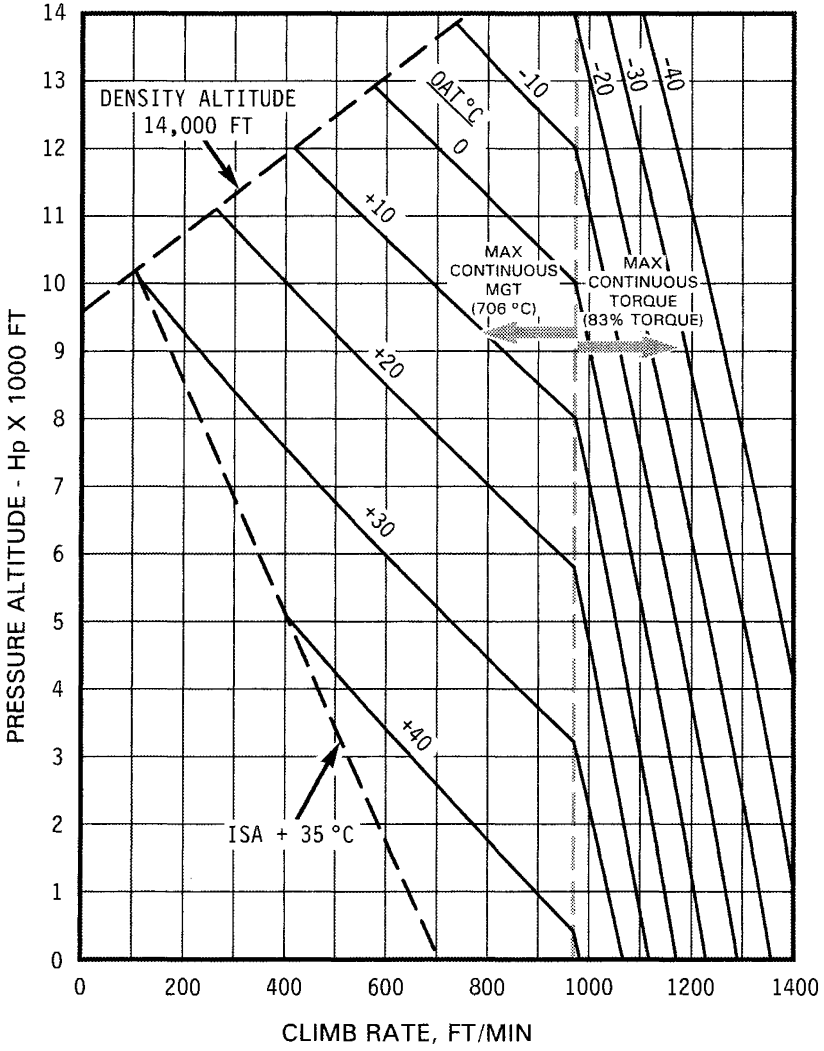
OUT OF GROUND EFFECT, ZERO WIND
MGT 5-MINUTE LIMIT
ENGINE ANTI-ICE AND CABIN HEAT OFF
50 AMP GENERATOR LOAD



OGE HOVER CEILING VS. GROSS WEIGHT

*Hover performance substantiated up to 11,000 feet (3350 meters) density altitude. Data beyond ISA + 35 °C and above 11,000 feet density altitude is presented only to determine performance with engine anti-ice, cabin heat, and/or generator loads over 50 amps.

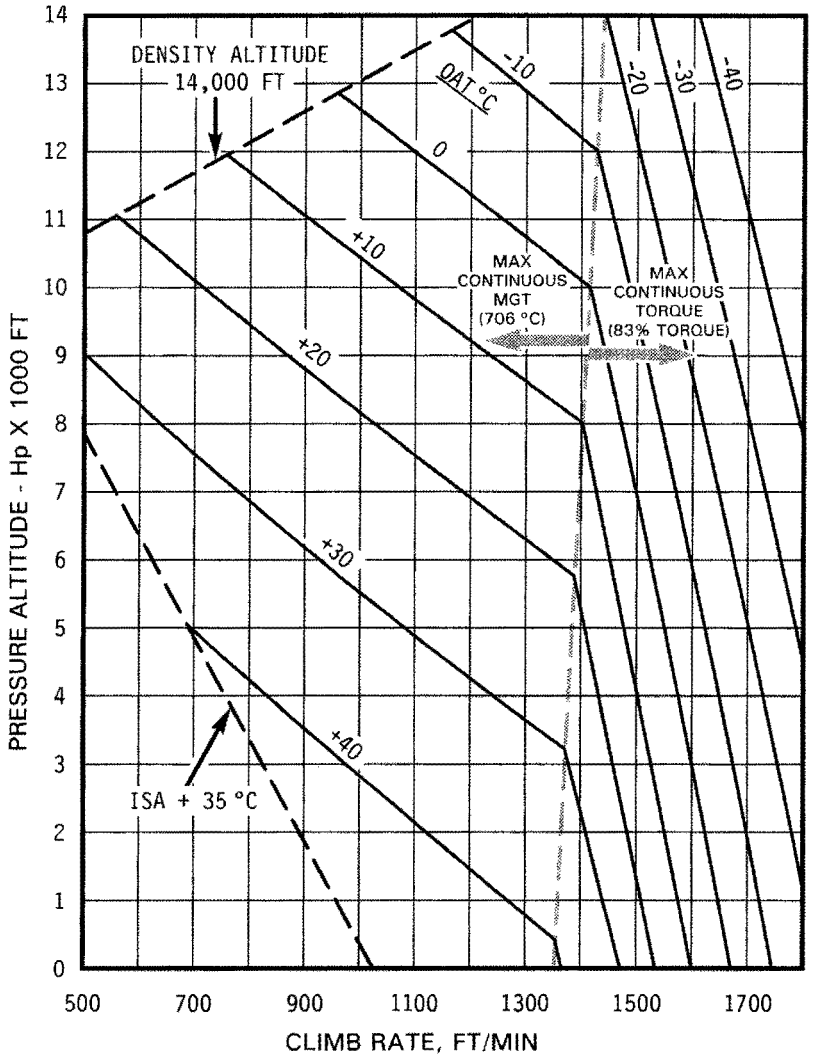
MAXIMUM CONTINUOUS TORQUE OR MAXIMUM CONTINUOUS MGT
60 KIAS CLIMB SPEED
ENGINE ANTI-ICE AND CABIN HEAT OFF



ENGINE ANTI-ICE MAY REDUCE CLIMB RATE UP TO 300 FT/MIN
FULL CABIN HEAT MAY REDUCE CLIMB RATE UP TO 600 FT/MIN

CLIMB PERFORMANCE, 2700 LB GROSS WEIGHT

MAXIMUM CONTINUOUS TORQUE OR MAXIMUM CONTINUOUS MGT
60 KIAS CLIMB SPEED
ENGINE ANTI-ICE AND CABIN HEAT OFF

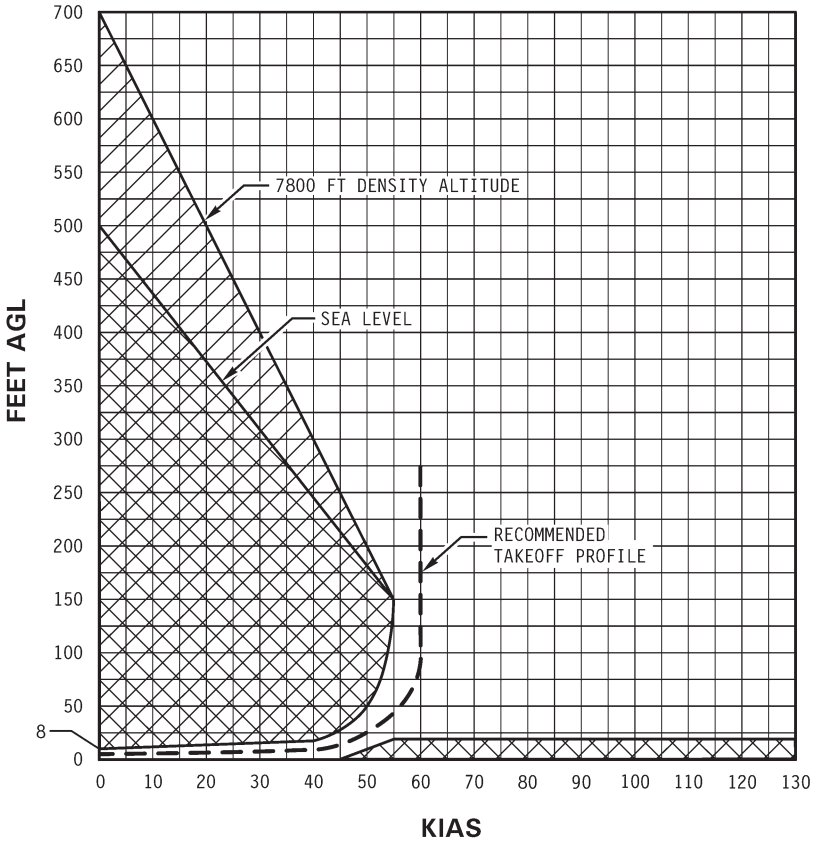


ENGINE ANTI-ICE MAY REDUCE CLIMB RATE UP TO 400 FT/MIN
FULL CABIN HEAT MAY REDUCE CLIMB RATE UP TO 700 FT/MIN

CLIMB PERFORMANCE, 2200 LB GROSS WEIGHT

DEMONSTRATED CONDITIONS:
- SMOOTH HARD SURFACE
- WIND CALM
- 2700 LB GROSS WEIGHT
- HOVER POWER +10% TORQUE FOR TAKEOFF

AVOID OPERATION IN CROSS-HATCHED AREAS



HEIGHT - VELOCITY DIAGRAM

NOISE CHARACTERISTICS

The following noise levels comply with 14 CFR Part 36, Appendix H and ICAO Annex 16, Volume 1, Chapter 8 noise requirements and were obtained from FAA-approved data from actual noise tests.

Model: R66
Engine: Rolls-Royce Model 250-C300/A1
Gross Weight: 2700 lb (1225 kg)

Configuration		V_h KTAS	Noise Level (EPNdB)		
			Flyover	Takeoff	Approach
Earlier Version	Clean	117	84.5	87.8	87.8
	Dirty	108	84.8	87.8	88.6
Later Version	Clean	117	84.2	86.2	86.1
	Dirty	109	84.6	87.1	89.5

Notes:

1. Configurations are:

   Earlier version - Horizontal Stabilizer is mounted adjacent to tail gear box.

   Later version - Horizontal Stabilizer is mounted under tailcone forward of tailrotor.

2. The dirty configuration has air conditioning and four doors with bubble windows installed, and landing gear strut fairings removed.

These noise levels meet the requirements for a Stage 3 helicopter as defined in 14 CFR Part 36.

NOTE

No determination has been made by the Federal Aviation Administration that the noise levels of this aircraft are or should be acceptable or unacceptable for operation at, into, or out of any airport.