Carson Helicopters, Inc.
Perkasie, PA 18944

# FAA APPROVED
# ROTORCRAFT FLIGHT MANUAL
# SUPPLEMENT NO. 9
# For

Sikorsky Model S61A/N (SHORT FUSELAGE) HELICOPTERS EQUIPPED WITH A GOODRICH RESCUE HOIST SYSTEM.

This supplement must be attached to the Sikorsky S61A/N Rotorcraft Flight Manual SA 4045-82 or NATOPS Flight Manual Navair 01-0230HLC-1 when the Goodrich Rescue Hoist System 44311-10 is installed in accordance with STC SR02507 NY. This Supplement is applicable to S61A/N model aircraft modified by STC SR1585NY, (Composite Main Rotor Blades) and S61A/N short fuselage configuration. The information contained herein supplements the information of the basic RFM. For limitations, procedures, and performance information not contained in this supplement, consult the basic RFM.

FAA Approved By:

[redacted]
for Anthony Socias
Manager, New York ACO

Date of Approval:
FEB - 7 2008

Revision IR

## Log of Revisions

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SECTION I

LIMITATIONS:

Class B external loads: Category A or B operations

Class D external loads: Category A operations only

Minimum crew: 2 pilots and a hoist operator

Maximum Hoist load: 600 pounds

Maximum Gross Weight:
Class D Operations: See Figures 1, 2, 5 and 6 or 7 in the Performance Section.
Class B Operations. See Figures 3, 4, 5 and 6 or 7 in the Performance Section.

Maximum airspeed with a load on the hoist or the hoist cable extended: 65 KIAS

Maximum rate of climb or descent with a load on the hoist or the hoist cable extended: 1000 fpm.

A manual cable cutter must be easily accessible to the hoist operator.

Aircraft Configuration:

1. CT58-140-1 or -2 engines
2. Main Gear Box P/N S6135-20600-039 and subsequent
3. Ribbed pocket tail rotor blades P/N S6117-30101-043 and subsequent
4. Bifilar assembly P/N S6112-23039-017 or -018
5. Beam Pitch Control Tail Gear Box P/N S6135-66705-1 and Subsequent
6. Fixed Land Main Gear or Sponson Landing Gear
7. STC SR1585NY (Composite Main Rotor Blades P/N163-101-1)
8. S61 short fuselage configuration.

PLACARDS

(Except as otherwise noted, placards must be placed in the pilots compartment in clear view of the pilot.)

1. Goodrich Hoist approved for Class B and D loads. (Located on the instrument Panel.)
2. Hoist Maximum Load: 600 pounds. (Located adjacent to cabin hoist control panel.)

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SECTION II

NORMAL PROCEDURES

EXTERIOR CHECK

1. External Hoist - Check mount for security, electrical cables secure and no fluid leaks

INTERIOR CHECK

1. Hoist operator's panel - Connections secure
   Cable cut switch cover closed
   Pendant connected and secure

2. Safety harness - available

3. Cable cutter - available and secure

4. Rescue devices - serviceable and secure

5 Cabin - secure loose items

COCKPIT CHECK

1. Overhead circuit breaker panel - Hoist Control and Hoist Shear circuit Breakers - IN

2. Overhead panel - Hoist Switch - OFF

3. Overhead panel - Cable Hoist shear switch cover safety wired closed.

4. Center console aft side, floor level (center) - Hoist Power circuit breaker - IN

PRE-TAXI

NOTE

The cockpit Hoist Switch controls which stations have the ability to shear. The switch in the CREW or PILOT position does not limit which station can operate the hoist up or down. The hoist is active in either CREW or PILOT position and will be controllable from all stations (pendant, panel or pilot). The pilot hoist switch has priority, and will override the cabin switches.

Hoist System - Check

1. Pilot, copilot and hoist operator intercom - functional

2. Hoist Switch - Crew

3. Hoist operator - functionally check hoist operation from cabin control panel and with the pendant
   - test shear circuits in accordance with Goodrich Operator and Maintenance Manual, P/N 44311-10
   - Verify that pilot collective hoist switch overrides panel/pendant controls

4. Hoist Power Switch - Pilot

5. Pilot - functionally check hoist operation with collective hoist switch.

6. Hoist Switch - OFF

HOIST OPERATION

Prior to hoist operations, the pilot should make sure that the aircraft can hover at the expected ambient conditions at the anticipated hoist operation location, including the anticipated hoist load. A viable escape plan should be established in the event of an engine failure. Applicable operating rules may require that OEI HOGE power is available.

1. Check circuit breakers - IN

2. Hoist master switch - PILOT or CREW

CAUTION

The hoist operator must wear a safety harness and be tethered to a cabin anchor point and other crewmembers must be similarly secured or in a seat with seat belt fastened BEFORE opening the cabin door.

CAUTION

The hoist operator should wear heavy gloves to prevent injury from broken cable strands.

CAUTION

The hoist operator should control the hoist cable/load at all times to minimize cable contact with the helicopter. Aircraft acceleration with the hoist cable extended could cause cable contact with the aircraft side. When practical, extension or retraction of the hoist cable/load should be restricted to a hover or as slow a speed as possible.

3. Open and lock cabin door

4. It is the hoist operator's responsibility to assure that hoist cable does not contact any portion of the aircraft. In situations where contact with airframe or other obstacle is observed, hoisting should be interrupted while the contact area on the cable is inspected. If any broken wires, unraveling, or kinks are observed, hoisting operations should be discontinued and the cable replaced.

WARNING

Reeling a kinked/damaged cable into the hoist may cause a hoist jam, rendering the hoist inoperative.

5. Hoist operator is responsible to maintain stability of the hoisted load by use of hoist controls, ICS calls to the pilot, and physical control of cable. For minor oscillations, stop reel-in, apply hand motion to cable in direction opposite to the oscillation. For significant oscillation, stop reel-in, start reel-out or call for pilot to lower aircraft and/or take corrective action.

WARNING

If not quickly stopped, the instability may become unmanageable. Reeling in an unstable load will only aggravate the motion

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6. All crew should observe for shock loads, jerks, or snaps that impart high loads on the cable. If observed, hoisting should be interrupted and cable inspection undertaken to verify integrity (no damage) before resuming operations. If damaged, replace cable before next mission.

CAUTION

Static electricity should be dissipated by a suitable means before ground personnel touch the hook/cable or before personnel lowered by hoist touch the ground.

7. Pilot's hoist switch, cabin hoist switch, or pendant hoist switch - DOWN/UP as required.The pendant is the preferred control since it has variable speed capability. When practical, extension or retraction of the hoist cable/load should be restricted to a hover or as slow a speed as possible.

CAUTION

Adjust airspeed so that hoist cable/load trails aft at no more than 45 degrees.

8. Hoist load - recover and secure

CAUTION

Position recovered hoist loads in the forward cabin to avoid exceeding aft Cg limits.

9. Cabin door - CLOSE

SECTION III

EMERGENCY PROCEDURES

EXTERNAL ELECTRIC HOIST

SYSTEM DESIGN FEATURES: (Cabin hoist control panel)

The CAUTION light is on when the cable is within the first or last 10 feet. The hoist will be automatically limited to a fixed slow speed for the last 10 feet.

A flashing OVERTEMP light indicates the motor and/or gearbox are hot. The hoist cycle can be completed and the hoist should be allowed to cool until the indicator stops flashing. Then resume hoist operation.

A steady OVERTEMP light indicates that the hoist is no longer operable because the thermal fuse has melted.

WARNING

Do not shear the hoist when personnel are on the hoist. Maneuver the aircraft clear of ground personnel prior to shearing the hoist cable.

ENGINE FAILURE DURING HOIST OPERATIONS

The procedure to follow when an engine fails is dependent upon many factors. Prior to establishing a hover, the pilot must establish an escape plan and determine when shearing the hoist is appropriate. When personnel are not on the hoist, shearing the hoist after engine failure is recommended. If personnel are on the hoist at engine failure, the pilot and hoist operator should either return the personnel to the surface and then shear the cable or execute a fly away maneuver after bringing the personnel up and into the cabin. The flight crew should determine OEI HOGE capability prior to conducting a hoist operation.

1. Hoist in and recover the load if practical using 2 ½ minute power.
2. Adjust collective to achieve 2 ½ minute power and a minimum of 100% Nr.
3. Climb and slowly achieve Vtoss
4. When clear of obstacles either retrieve load or shear cable.
5. Retract landing gear, if applicable, with positive climb rate.
6. Reduce power to 30 minute rating.
7. Land when practical.

If fly away maneuver is not possible:

1. Adjust collective as needed.
2. Maneuver away from personnel of the ground.
3. Hoist Shear Switch - SHEAR
4. Increase collective to cushion landing.

HOIST FAILS TO REEL IN/OUT

1. Check panel/pendant power ON light and all circuit breakers IN

2. Verify OVERTEMP light is not steady.

3. Attempt control of hoist from pendant, cabin control panel and/or pilot's hoist switch

4. Disconnect pendant and attempt operation from the cabin control panel or pilot's switch.

5. If unsuccessful, recover cable/load by hand, land and recover, or jettison cable at lowest safe altitude.

UNCOMMANDED HOIST OPERATION

1. Push the Emergency Stop Button on the cabin hoist control panel.

NOTE

After pushing Emergency Stop Button, push it again and wait for the self test feature to complete. Normal operation may then be possible.

2. Attempt to stop hoist operation with the pilot's switch (which overrides the cabin switches). In unsuccessful, turn cockpit Hoist Switch OFF

3. Disconnect pendant from cabin control panel, turn Hoist Switch ON and attempt control from the cabin hoist control panel or use of the pilot's hoist switch.

4. If unsuccessful, turn cockpit Hoist Switch OFF

5. If control not regained, recover cable/load by hand, land and recover, or jettison cable at lowest safe altitude.

HOIST CABLE/LOAD ENTANGLED IN GROUND OBSTRUCTION

1. Attempt to gain assistance from ground personnel.

2. Pilot or cabin hoist shear switch - Lift cover and place switch in SHEAR.

NOTE

The pilot's shear switch will cut the cable regardless of the position of the hoist switch. The cabin shear switch will cut the cable only when the hoist switch is placed in the CREW position.

GENERATOR OUT

1. The hoist will continue to operate, but at a slower rate of approximately 100 fpm.

SECTION IV

PERFORMANCE -

Figure 1. CT58-140-1 Engine 2 ½ Minute Power Available

Figure 2. CT58-140-2 Engine 2 ½ Minute Power Available

Figure 3. CT58-140-1 or -2 Engine Takeoff Power (5 Min. Twin, 30 Min OEI) 100% Nr

Figure 4. CT58-140-1 or -2 Engine Takeoff Power (5 Min. Twin, 30 Min OEI) 103% Nr

Figure 5. Indicated Torque vs. Engine Shaft Horsepower

Figure 6. Power Required to Hover Out of Ground Effect, 100% Nr

Figure 7. Power Required to Hover Out of Ground Effect, 103% Nr

Recommended Procedure For Over Specification Engines:

1. Top each engine and determine available torque. Use the lowest engine torque for Class D operations. For two engine operations, use the average of the two torques.

2. Using ambient pressure altitude and temperature, determine available engine torque for a minimum spec. engine from Figure 1, 2, 3 or 4 as appropriate. For Class D operations, use Figure 1 or 2, as appropriate. If topping torque is higher, it can be used.

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3. Use Figure 5 to determine available shaft horsepower for each engine.

4. Use Figure 6 or 7 to determine maximum weight to hover OGE. Enter at the bottom of the chart with available shaft horsepower. For two engine operations enter with the sum of the two engine shaft horsepowers. Go up vertically to intersect with the ambient wind. Follow the guide line to the base line. Go vertically to the ambient temperature. Follow the guide line to the base line. Go vertically to the ambient pressure altitude. Interpolate to determine the gross weight to hover OGE.

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RFMS #9
S61A/N (SHORT FUSELAGE)

# POWER AVAILABLE
# 2 1/2 MINUTE POWER
## CT58-140-1 ENGINE
## 100% NR
## SPECIFICATION POWER

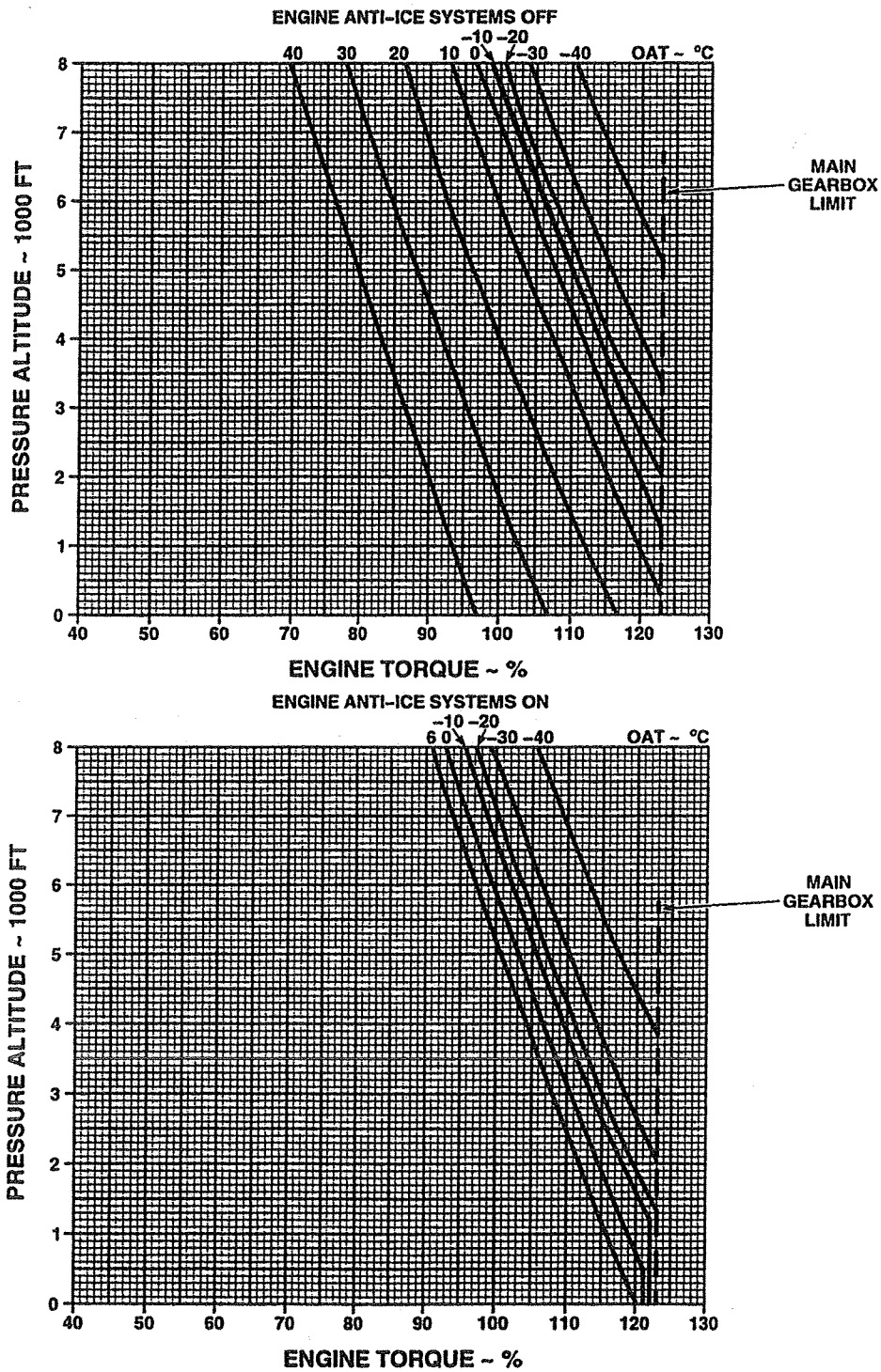


FIGURE 1

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RFMS #9
S61A/N (SHORT FUSELAGE)

# POWER AVAILABLE
# 2 1/2 MINUTE POWER
## CT58-140-2 POWER
## 100% NR
## SPECIFICATION POWER

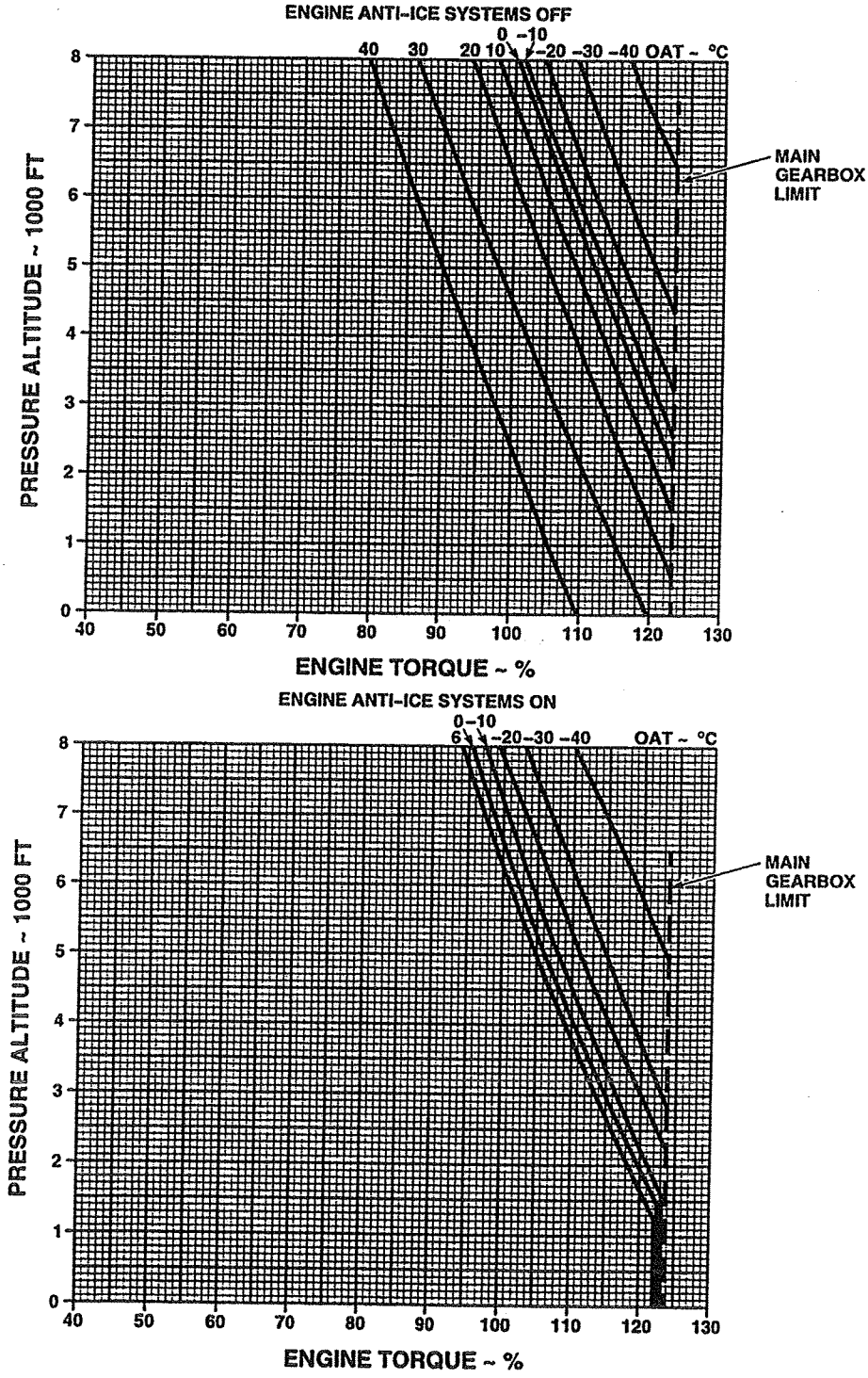


FIGURE 2

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CARSON HELICOPTERS, INC.
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RFMS #9
S61A/N (SHORT FUSELAGE)

# POWER AVAILABLE
# TAKEOFF POWER (5 MIN TWIN, 30 MIN OEI)

## CT58-140-1, -2 ENGINE(S)
## 100% NR
## SPECIFICATION POWER

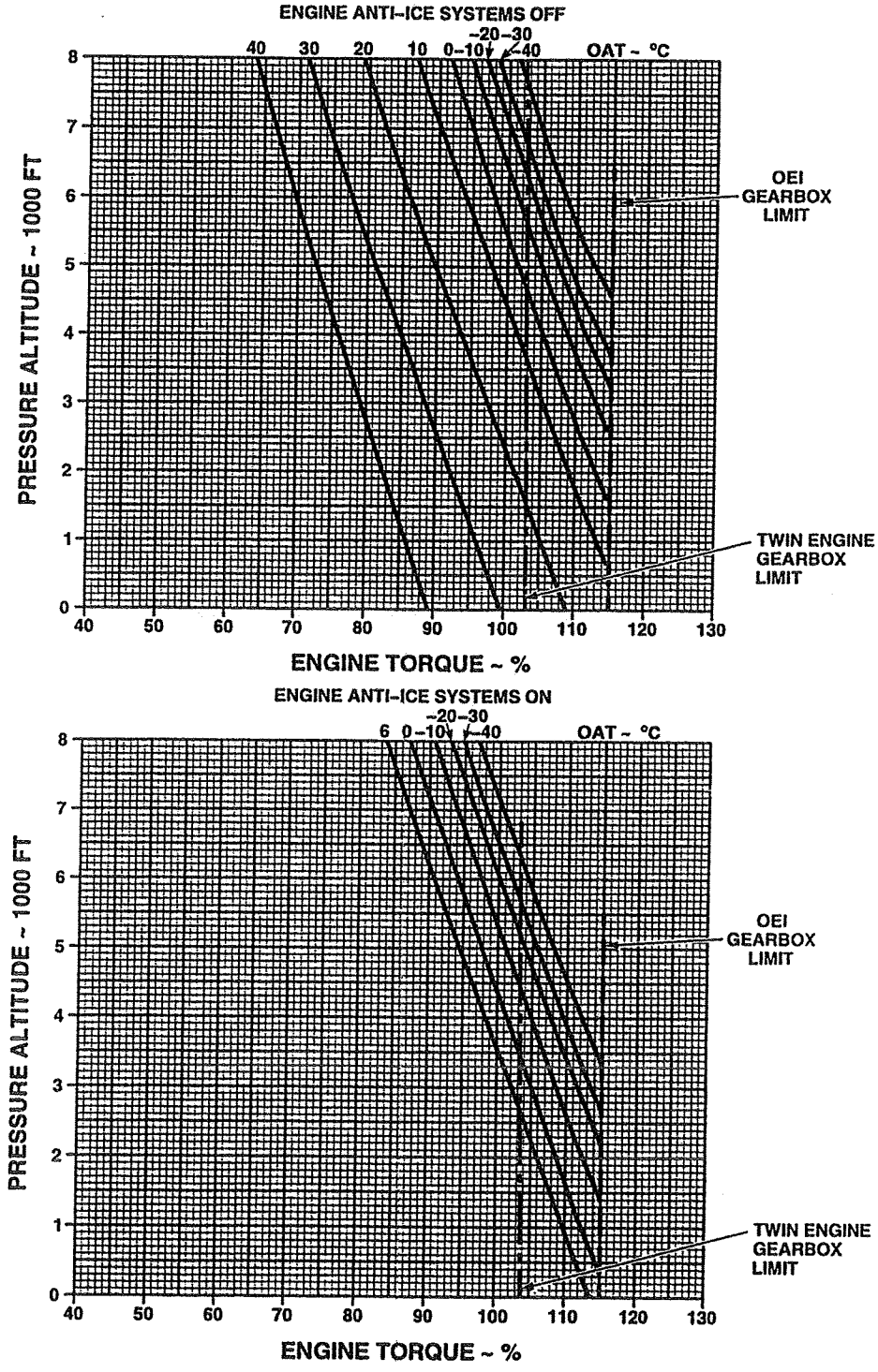


FIGURE 3

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CARSON HELICOPTERS, INC.
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RFMS #9
S61A/N (SHORT FUSELAGE)

# POWER AVAILABLE
# TAKEOFF POWER (5 MIN TWIN, 30 MIN OEI)
## CT58-140-1, -2 ENGINE(S)
## 103% NR
## SPECIFICATION POWER

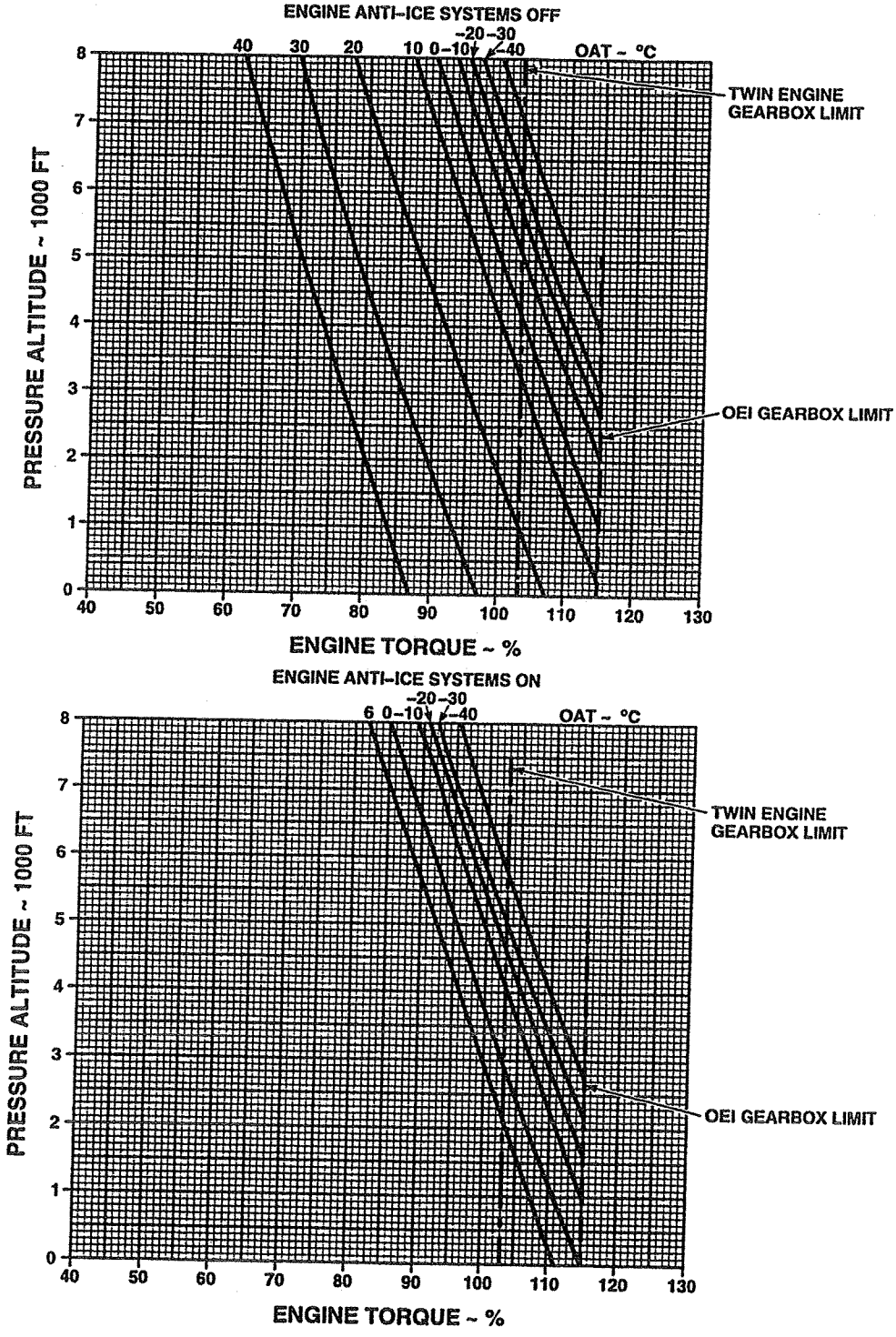


FIGURE 4

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RFMS #9
S61A/N (SHORT FUSELAGE)

# INDICATED TORQUE VS ENGINE SHAFT HORSEPOWER

## CT58-140 ENGINES

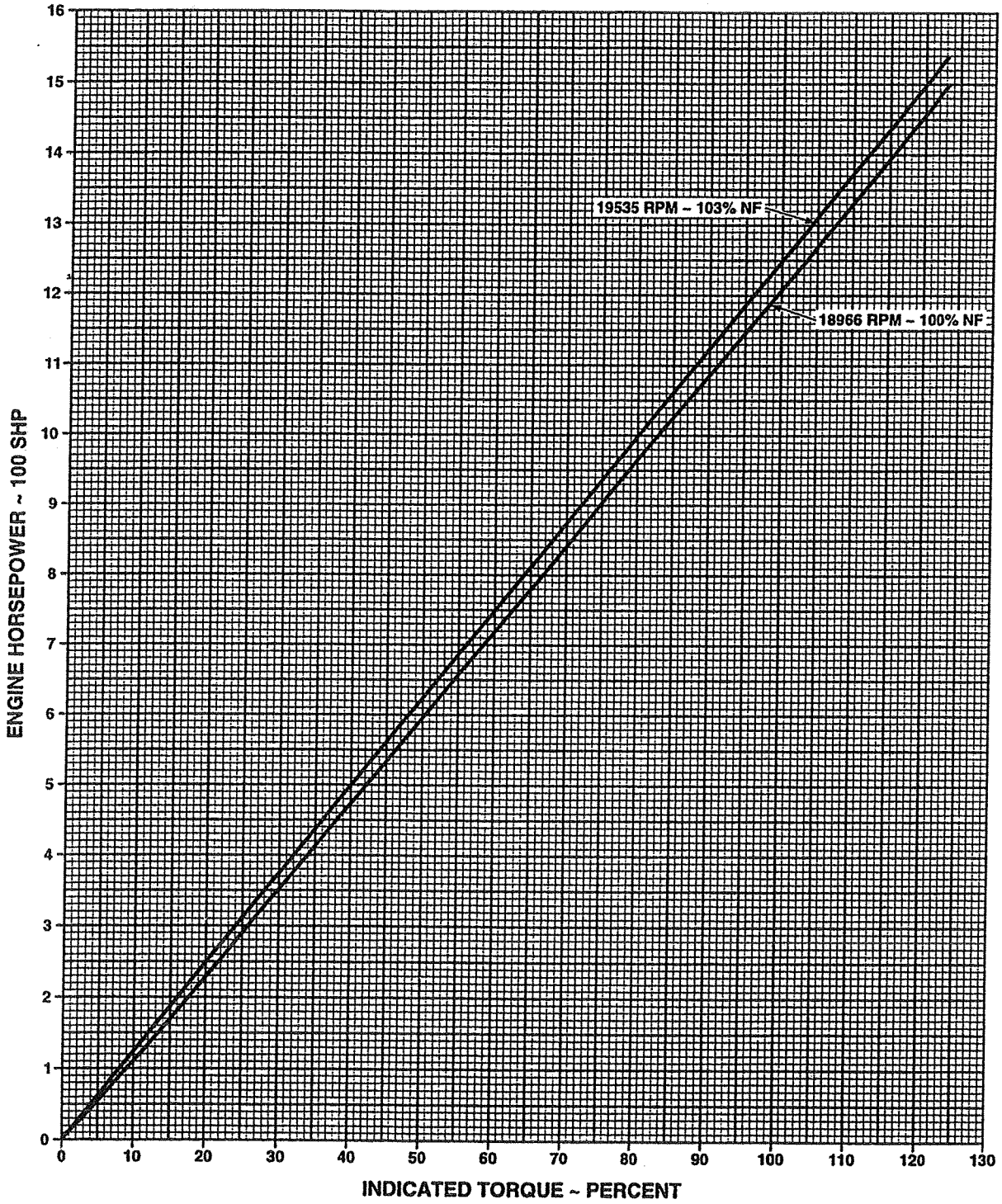


FIGURE 5

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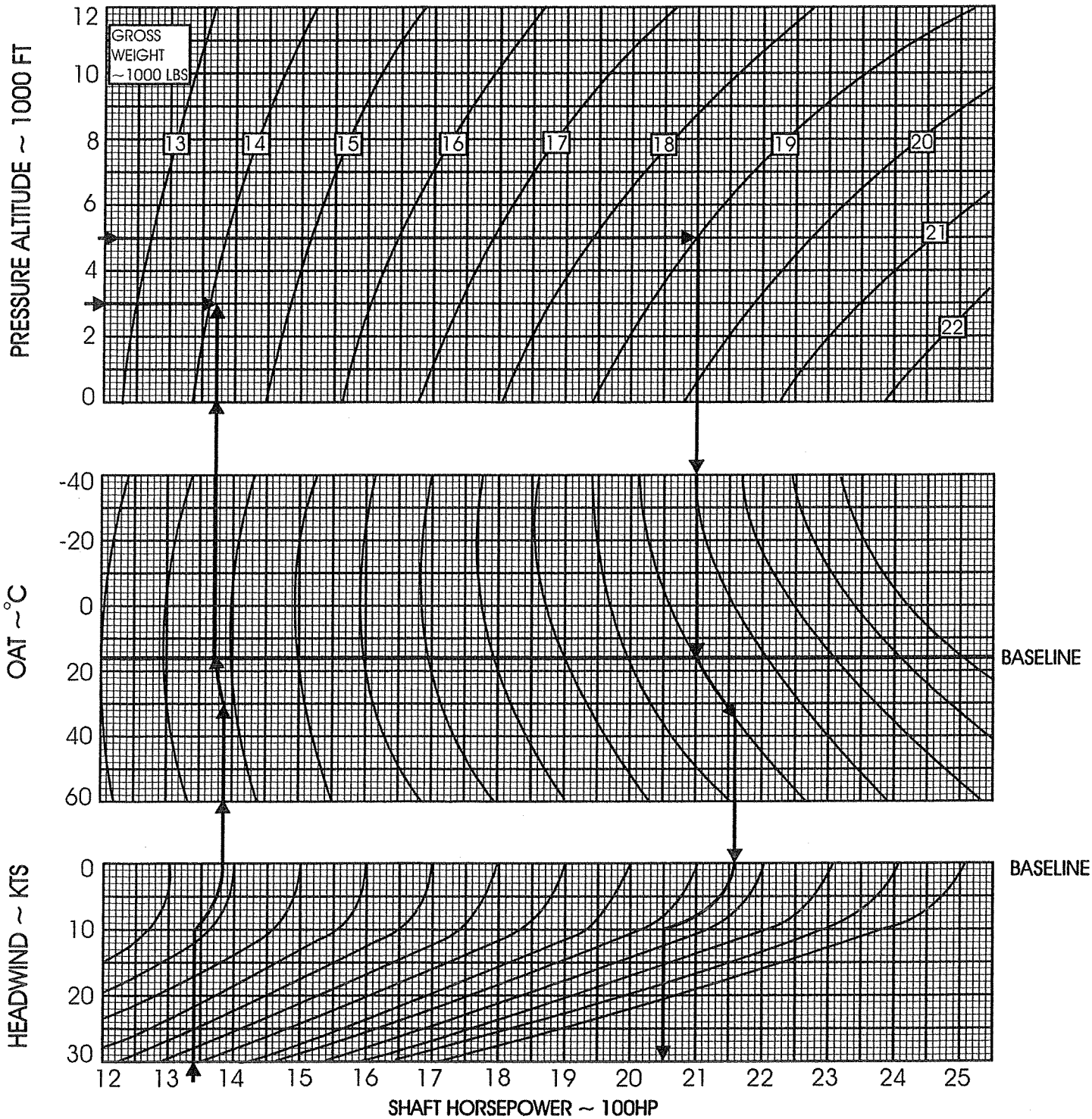
RFMS #9
S61A/N (SHORT FUSELAGE)

NO ICE SHIELD
SOURCE:
FLT TEST

# POWER REQUIRED TO HOVER OUT OF GROUND EFFECT

10 KVA GENERATOR LOAD
CT58-140-1-2

COMPOSITE BLADES
100% NR




POWER REQUIRED TO
HOVER OGE, 100% NR

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FIGURE 6

CARSON HELICOPTERS, INC.
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RFMS #9

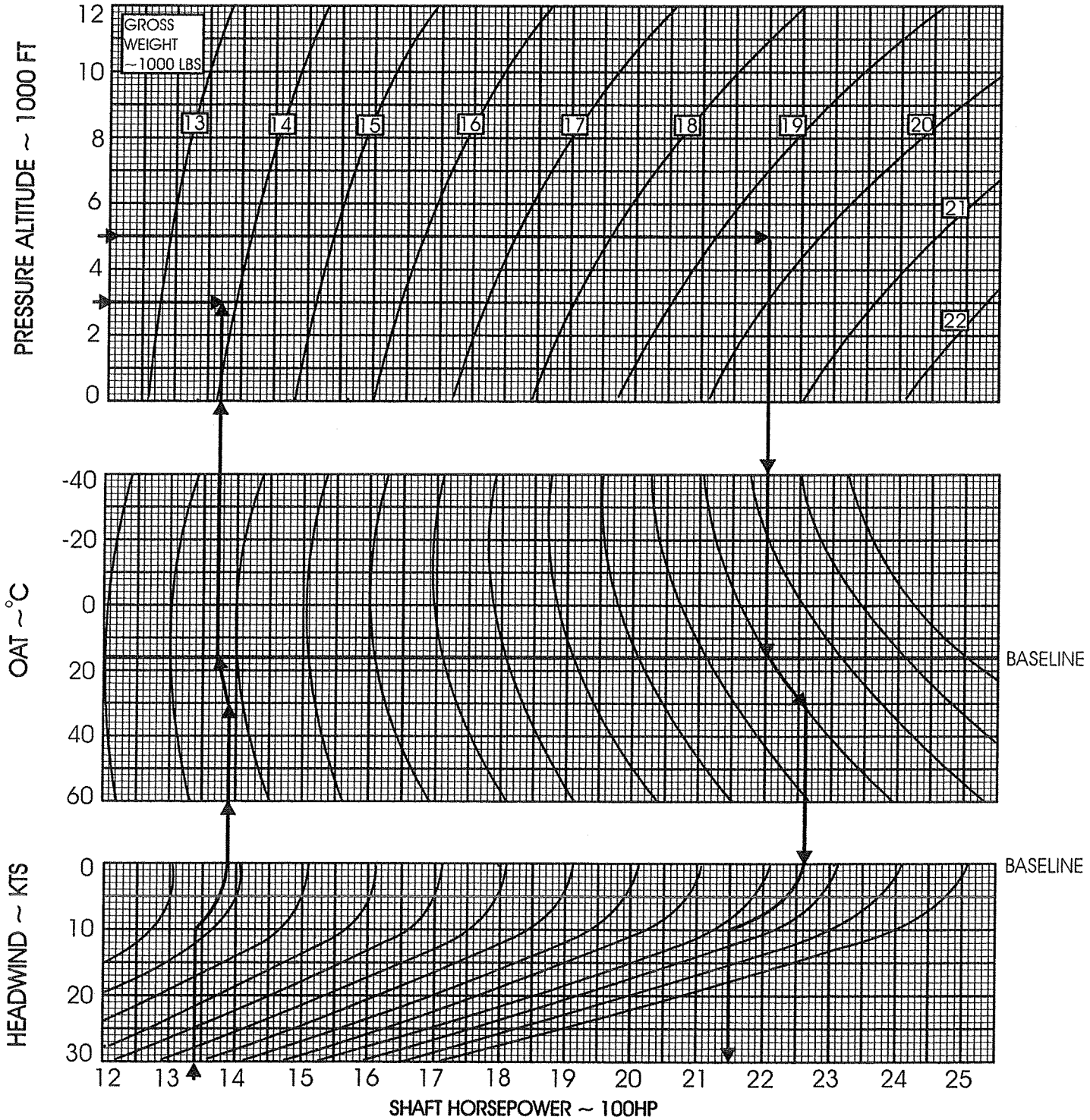
S61A/N (SHORT FUSELAGE)

NO ICE SHIELD
SOURCE:
FLT TEST

# POWER REQUIRED TO HOVER OUT OF GROUND EFFECT

COMPOSITE BLADES
103% NR

10 KVA GENERATOR LOAD
CT58-140-1-2




POWER REQUIRED TO HOVER OGE, 103% NR

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FIGURE 7

PART 2 (NON FAA APPROVED)

## WEIGHT AND BALANCE

| ITEM | WEIGHT (lbs) | LONG.ARM (inches) | LATERAL ARM (inches) |
|---|---|---|---|
| External Truss Mount | 17 | 340 | 43 |
| Hoist Assembly | 98 | 340 | 57 |
| Control Panel | 5 | 317.5 | 35 |
| Pendant | 5 | 322 | 37 |
| Hoist Load | Variable | 340 | 57 |
| Cable Cutter Tool | 3 | 323 | 35 |
| Operator's Harness | 7 | 357 | 6 |

### Hoist Caution Zones and Cable Speed Characteristic

| Hook Assy. Position | Hoist Control | Characteristic |
|---|---|---|
| Hook in stowed position. | Control Pendant Assembly | 1. Caution Indicator illuminated. |
| Hook within 18 to 24 in. of hoist. | Control Pendant Assembly<br>Operator Panel Pilot Control | 1. Caution indicator ON.<br>2. Cable speed (Variable) 0 to 35 fpm.<br>3. Control cable speed (Not variable) directly to 35 fpm.<br>4. Pilot control cable speed (Not variable) directly to 35 fpm. |
| Hook within 24 in. to 10.5 ft. from hoist. | Control Pendant Assembly<br>Operator Pane! Pilot Control<br>Pilot Control | 1. Caution indicator ON.<br>2. Cable speed (Variable) 0 to 75 fpm.<br>3. Controls cable speed (Not Variable) directly to 75 fpm.<br>4. Pilot controls cable speed (Not Variable) directly to 75 fpm. |
| Hook is beyond 10.5 feet from hoist | Control Pendant Assembly Operator<br>Panel Pilot Control | 1. Caution indicator OFF.<br>2. Cable speed (variable) 0 to 325 fpm.<br>3. Controls cable speed (Not Variable) directly to 325 fpm.<br>4. Pilot controls cable speed (Not variable) directly to 100 fpm. |
| Hook assembly is extended until 7 to 7.5 wraps of cable remains on cable storage drum. | Control Pendant Assembly Pilot Control<br>Control Pendant Assembly | 1. Caution indicator ON.<br>2. Controls cable speed decelerates (not variable) directly to 75 fpm.<br>3. Caution indicator on control pendant ON.<br>4. Cable speed (variable) 0-75 fpm. |
| Hook assembly is extended until 4 to 4.5 wraps of cable remains on cable storage drum. | All controls | 1, Hoist operation stopped for down direction.<br>2. Caution indicator ON. |
| Hook assembly is extended until 3 to 3.5 wraps of cable remains on cable storage drum. | All controls | 1. Hoist operation stopped for down direction.<br>NOTE: S1 & S2 are fail safe switches and will activate only if the override switch S11 is actuated or Switch S3 and S4 fails. |