UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

ENSTROM 280F

OPERATORS MANUAL
AND
F.A.A. APPROVED
ROTORCRAFT FLIGHT MANUAL

REPORT NO. 28-AC-019

TYPE CERTIFICATE NO. H1CE

HELICOPTER SERIAL NO. _____

HELICOPTER REGISTRATION NO. _____

THIS MANUAL MUST BE CARRIED IN THE HELICOPTER AT ALL TIMES. SECTIONS 2, 3, 4, AND 5 ARE F.A.A. APPROVED. SECTION 10 INCLUDES SUPPLEMENTS TO THE TYPE CERTIFICATE WHICH ARE F.A.A. APPROVED IF SO DESIGNATED.

F.A.A APPROVED BY: Chas F. Arnold

FOR MANAGER
CHICAGO AIRCRAFT CERTIFICATION OFFICE
CENTRAL REGION
FEDERAL AVIATION ADMINISTRATION

DATE: DEC. 31, 1980

REVISED: November 7, 1989

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

TABLE OF CONTENTS
AND
LIST OF EFFECTIVE PAGES

FAA Approved: 18 Oct 2024

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

LOG OF SUPPLEMENTS

SUP. NO	DESCRIPTION	DATE	FAA APPROVED
1	Wet/Dry Dispersal System	12-31-80	C. E. Arnold
2	Float Landing Gear	12-31-80	C. E. Arnold
3	External Loads	12-31-80	C. E. Arnold
4	Snowshoe	12-31-80	C. E. Arnold
5	(Reserved)		
6	Right Side Pilot Configuration	6-26-81	C. E. Arnold
7	(Reserved)		
8	Emergency Float Landing Gear	11-20-81	C. E. Arnold
9	(Reserved)		
10	(Reserved)		
11	Auxiliary Fuel Tank	9-23-83	J. Hannen
12	Engine Exhaust Muffler	7-16-86	P. Moe

APPROVED FOR MANAGER CHICAGO AIRCRAFT CERTIFICATION OFFICE, CENTRAL REGION

FEDERAL AVIATION ADMINISTRATION

FAA Approved: March 28, 2017

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

LOG OF PAGES AND REVISIONS

REV. NO.	PAGES	DESCRIPTION	DATE	F.A.A. APPROVED
1	FM 10-2-1 thru 10-2-6	Revised Float Supplement to Add Restricted Category Envelope	6/26/81	G. E. Arnold
2	ALL	Revised Basic Flight Manual for Increased Altitude Capability in Both Normal and Restricted Categories. Additional Minor Changes and Corrections Changes in this revision are not indicated by black vertical line since all pages were affected.	1/30/84	William A. Patterson
3 Applicable for S/N 1517 and subsequent. Not Applicable below S/N 1517 unless in conformity to Enstrom Specification Drawing Number 28-100015.	i,ii,iv, 1.4,1.5, 2.1 thru 2.7,5.1 thru 5.12, 6.1, 6.2,6.8, 6.11, 10.1.5, 10.1.7, 10.1.8, 10.2.2, 10.2.3, 10.2.7,	Allows increased gross weight to 2600 lbs in the Normal Category for S/N 1517 and Subsequent or if the helicopter meets the requirements of Enstrom Specification Drawing #28-100015 (continued on p. iv)	7/1/84	William A. Patterson

* APPROVED FOR MANAGER, CHICAGO AIRCRAFT CERTIFICATION OFFICE, CENTRAL REGION
FEDERAL AVIATION ADMINISTRATION

NOTE: All changes are indicated by a black vertical line along right margin.

REVISION

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

LOG OF PAGES AND REVISIONS

REV. NO.	PAGES	DESCRIPTION	DATE	F.A.A. APPROVED
3 (cont'd)	10.2.9, 10.2.10, 10.3.2, 10.3.3, 10.11.2 thru 10.11.7	(Continued)	7/1/84	William L. Norton
4	i iv 2.3 2.7 4.6 4.7 7.3 7.4 thru 7.8 8.12 8.13 8.14	Added pages Revised Added instruction Added placard Added instruction Revised Added paragraph Moved text Added autorotation rpm Added figure Added figure	29 AUG 85	Gary J. Louser
5	i ii iii iv thru vi 1.4 2.3 2.4 2.5 2.6 3.2 3.3 3.9 4.7 4.11 4.13 5.1 thru 5.4 7.5	Changed/Added Pages Added Supplement Changed Page Changed/Added Pages Minor Correction Added Note Moved Text Moved Text Moved Text Minor Changes Minor Changes Added Paragraph Added Cautions Added Cautions Added Page Figures Redrawn, Minor Correction Added Paragraph	DEC 14 1988	Pat Mac

APPROVED FOR MANAGER CHICAGO AIRCRAFT CERTIFICATION OFFICE,
CENTRAL REGION
FEDERAL AVIATION ADMINISTRATION

NOTE: All changes are indicated by a black vertical line along right margin.

REVISIONS:

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

LOG OF PAGES AND REVISIONS

REV. NO	PAGES	DESCRIPTION	DATE	FAA APPROVED
5 (cont'd)	7.6 thru 7.8 8.5 8.15 10.12.1	Moved Text, Added 28-Volt System Added 28-Volt System Added Page Added Page	Dec 14/88	Pat Moe
6	4.7, 4.9	Corrected Page Numbering Error	Nov 7/89	Pat Moe
7	i vi 3.10 thru 3.11	Revised List of Effective Pages FAA Approval Added Lamiflex Bearing Failure Emergency Procedures	Jul 9/12	J. Miess
8	i, ii, iii, vi vii, viii 4.1, 4.2, 4.3, 4.4 10.7.1 10.10.1	Updated Added EASA Approval Logs Added Fuel Management Inspection Checklist (Content removed, Reserved) (Content removed, Reserved)	MAR 28 2017	ACE-117C

APPROVED FOR MANAGER CHICAGO AIRCRAFT CERTIFICATION OFFICE, CENTRAL REGION

FEDERAL AVIATION ADMINISTRATION

FAA Approved: March 28, 2017

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

LOG OF PAGES AND REVISIONS

REV NO	FAA APPROVAL	SUMMARY DESCRIPTION
9		General updates, corrections, and clarifications (i, ii, vii thru ix, 4.1 thru 4.10, 6.6, 6.8, 8.8, 8.9, 8.11 thru 8.16, 9.0 thru 9.3, 10.12.1)
	RYAN B NELSON Digitally signed by RYAN B NELSON Date: 2024.10.18 14:30:23 -05'00' FTP, AIR-712, *for* Manager, Flight Test & Human Factors Branch, AIR-710 Federal Aviation Administration	18 Oct 2024 Approved Date

FAA Approved: 18 Oct 2024

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

EASA LOG OF REVISIONS

REV. NO	DATE	EASA APPROVED
1	Sep 28/03	Article 3, Commission Regulation (EU) 748/2012
2	Sep 28/03	Article 3, Commission Regulation (EU) 748/2012
3	Sep 28/03	Article 3, Commission Regulation (EU) 748/2012
4	Sep 28/03	Article 3, Commission Regulation (EU) 748/2012
5	Sep 28/03	Article 3, Commission Regulation (EU) 748/2012
6	Sep 28/03	Article 3, Commission Regulation (EU) 748/2012
7	Aug 17/15	FAA/EASA T.I.P.; FAA Approved on Behalf of EASA by G. Michalik*
8	Aug 16/17	FAA/EASA T.I.P.; FAA Approved on Behalf of EASA by W. Jaconetti♦
9	Oct 18/24	FAA/EASA T.I.P.; EASA Approved ▲

* T.I.P., Rev. 4 dated September 22, 2014, Section 3.2.11
♦ T.I.P., Rev. 5 dated September 15, 2015, Section 3.2.11
▲ T.I.P., Rev. 7 dated October 19, 2023, Sections 3.3 and 3.5.12.4

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

EASA LOG OF SUPPLEMENTS

SUP. NO	DESCRIPTION	DATE	EASA APPROVED	FAA APPROVAL ON BEHALF OF EASA
1	Wet/Dry Dispersal System	Sep 28/03	Article 3, Commission Regulation (EU) 748/2012	N/A
2	Float Landing Gear	Sep 28/03	Article 3, Commission Regulation (EU) 748/2012	N/A
3	External Loads	Sep 28/03	Article 3, Commission Regulation (EU) 748/2012	N/A
4	Snowshoe	Sep 28/03	Article 3, Commission Regulation (EU) 748/2012	N/A
5	[Reserved]			
6	Right Side Pilot Configuration	NOT EASA APPROVED		
7	[Reserved]			
8	Emergency Float Landing Gear	Sep 28/03	Article 3, Commission Regulation (EU) 748/2012	N/A
9	[Reserved]			
10	[Reserved]			
11	Auxiliary Fuel Tank	Sep 28/03	Article 3, Commission Regulation (EU) 748/2012	N/A
12	Engine Exhaust Muffler	Sep 28/03	Article 3, Commission Regulation (EU) 748/2012	N/A

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 1

GENERAL

REVISIONS:

Issued: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 1 - GENERAL

I. INTRODUCTION

This manual contains the operating instructions, procedures and limitations for the Enstrom 280F helicopter. The manual is divided into two basic parts, the FAA approved Rotorcraft Flight Manual (RFM) and Supplemental Data provided by The Enstrom Helicopter Corporation. Sections 2 through 5 and the portions of Section 10 so designated make up the FAA approved RFM. It is required by Federal Regulations that this manual be carried in the helicopter at all times.

II. OWNER RESPONSIBILITIES

Maintaining the helicopter in an airworthy condition is the responsibility of the owner. (See Section 8 for required inspections.) To aid the owner in this task The Enstrom Helicopter Corporation has a network of Distributors, Dealers, and Service Centers. In addition to this Operator's Manual, The Enstrom Helicopter Corporation has the following technical publications available for your helicopter:

A. 280F Maintenance Manual Supplement

B. 280F Parts Manual Supplement

C. Service Information Letters

D. Service Directive Bulletins

Information regarding dealer locations, technical publications and revisions can be obtained by contacting:

Enstrom Helicopter Service
The Enstrom Helicopter Corporation
Twin County Airport
PO Box 277
Menominee, Michigan 49858

III. PILOT RESPONSIBILITIES

A. The pilot is responsible for determining that the helicopter is safe for flight.

B. The pilot is repsonsible for operating within the limitations specified in Section 2.

C. The pilot should familiarize himself with the entire manual prior to receiving competent flight instruction.

REVISIONS:

Issued: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

IV. WARNINGS, CAUTIONS AND NOTES

The use of WARNINGS, CAUTIONS, and NOTES to emphasize important and critical instructions is defined as follows:

A. WARNING: An operating practice or procedure which, if not correctly followed, could result in personal injury or loss of life.

B. CAUTION: An operating practice or procedure which, if not correctly followed, could result in damage to, or destruction of, equipment.

C. NOTE: An operating practice or procedure which is essential and requires additional information.

V. SPECIFICATIONS

A. Principal dimensions of 280F helicopters:

Width overall	28 ft
Rotor diameter	32 ft
Height overall	9 ft
Length overall	29 ft 3 in.
Cabin width at seat	58 in.
Baggage box dimensions	16 in. x 18 in. x 31 in.
Tread - landing gear	7 ft 4 in.

B. Power Plant

Type	Lycoming Opposed
Designation	HIO-360-F1AD
Cylinders	4
Horsepower	225 hp (sea level to 12,000 ft)
RPM	3050
SFC (full rich)	.69 lb/hp/hr
Weight	357 lbs
Oil	10 qts (8 qts minimum for flight)

C. Ratios

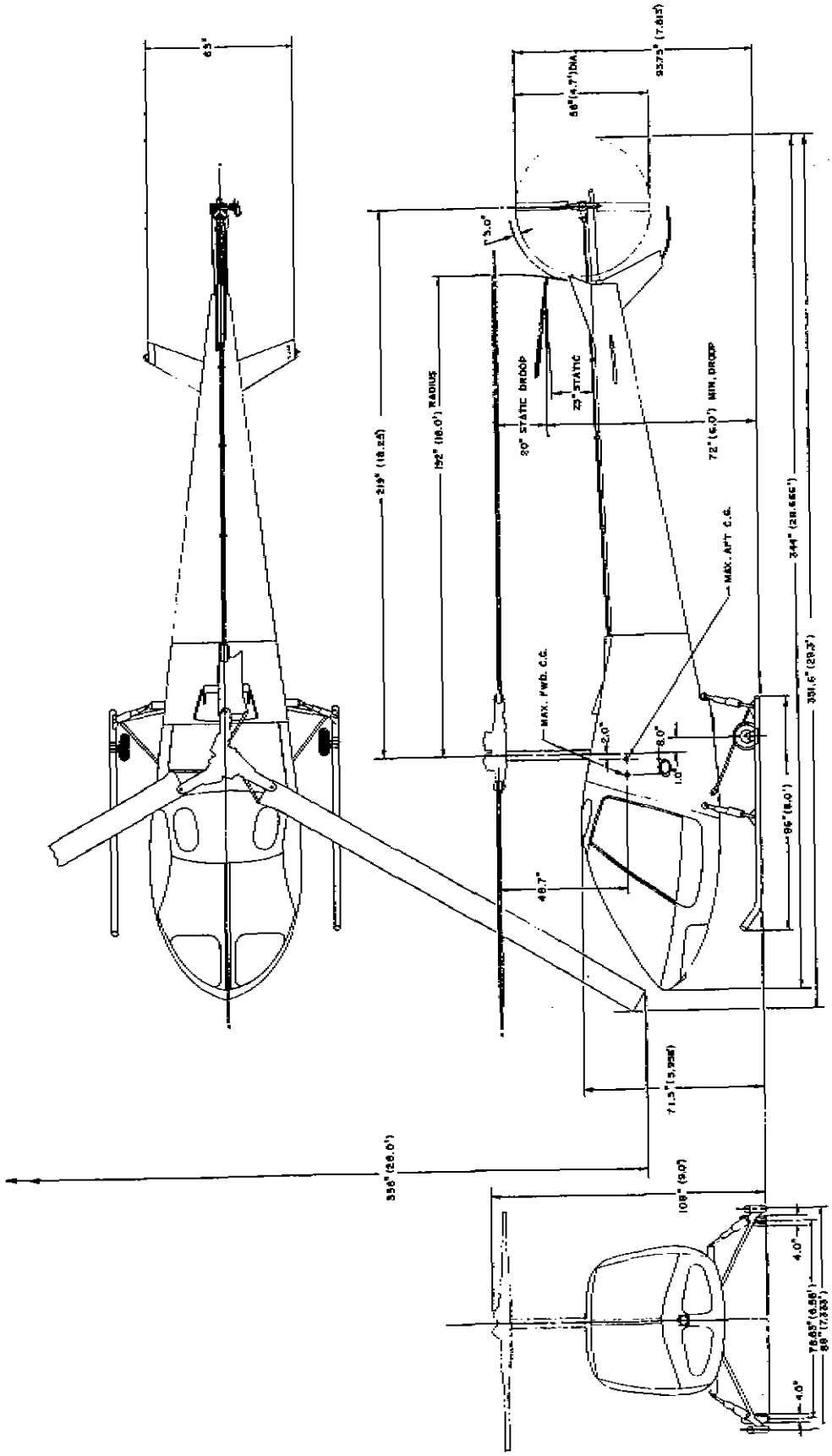
Lower drive pulley to upper pulley	1.213:1 (3050 - 2514 rpm)
Upper pulley to main rotor shaft	7.154:1 (2514 - 351 rpm)
Engine to main rotor	8.678:1 (3050 - 351 rpm)
Tail rotor input shaft to output shaft	1:1

REVISIONS:

Issued: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED



REVISIONS:

Issued: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

D. Rotor Systems

Number of blades, main rotor	3
Chord, main rotor blade	9.5 in.
Disk area, main rotor	804 sq ft
Number of blades, tail rotor	2
Chord, tail rotor blade	4.4 in.
Disk area, tail rotor	17.1 sq ft

E. Weight (see Figure 6.1)

Designed gross weight	2600 lbs
Empty weight	1550 lbs
Useful load	1050 lbs
C.G. travel	96.3 in. to 98.0 in. at 2600 lbs 92.0 in. to 98.8 in. at 2350 lbs 92.0 in. to 100.0 in. at 2000 lbs

NOTE: Four gross weight-c.g. envelopes apply to this helicopter, see Figure 6.1. Each envelope is associated with a different maximum ceiling and a different V_{NE} limitation, see Figure 5.1.

VI. PERFORMANCE (All altitudes are density altitude and performance based on a 2350 lb gross weight unless otherwise noted.)

A. Maximum speed

V_{NE} power on	117 mph IAS from SL to 3000 ft H_d. See Figure 5.1
V_{NE} power off	85 mph IAS from SL to 8200 ft H_d. See Figure 5.1

NOTE: Four different maximum ceiling/V_{NE} envelopes apply to this helicopter, see Figure 5.1. Each envelope corresponds to a gross weight/c.g. envelope, see Figure 6.1.

NOTE: This helicopter must meet the requirements of Enstrom Specification Drawing #28-10015. See Helicopter Logbook for verification that this helicopter meets these requirements.

B. Cruise speed 75% power	101 mph IAS at sea level
C. Maximum cruise speed	117 mph TAS at sea level 122 mph TAS at 3000 ft H_d
D. Maximum range speed	85 mph IAS at sea level

REVISIONS:

Issued: 12/31/80
Revised: 12/14/88

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

E.	Fuel consumption at 75% power	14.7 gal/hr
F.	Maximum endurance, no reserve 57 mph IAS at sea level	3.5 hrs
G.	Fuel capacity	42 gal (40 gal usable)
H.	Maximum R/C at sea level	1450 ft/min
I.	Hover ceiling IGE	13,600 ft (see Item K)
J.	Hover ceiling OGE	8700 ft
K.	Maximum approved operating altitude	12,000 ft, see Figure 5.1

REVISIONS:

Issued: 12/31/80
Revised: 7/1/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 2

OPERATING LIMITATIONS

REVISIONS:

FAA Approved: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 2 - OPERATING LIMITATIONS

I. TYPE OF OPERATION

A. This helicopter is approved for operation under day and night VFR - non-icing conditions.

NOTE: Night operation authorized under visual flight rules only. Orientation must be maintained by ground light or adequate celestial illumination.

B. Operation with doors removed is approved.

II. WEIGHT

A. The maximum gross weight of this helicopter is 2600 pounds. See Figure 6.1.

III. CENTER OF GRAVITY (All airspeeds are IAS unless otherwise noted.)

A. The longitudinal datum is 100.0 inches forward of the center line of the main rotor head.

B. There are four gross weight/c.g. envelopes for this helicopter. See Figure 6.1. Each envelope corresponds to one of four V_{NE}/altitude envelopes as described in paragraph IV. Also, see Figure 5.1.

NOTE: This helicopter must meet the requirements of Enstrom Specification Drawing #28-100015. See Helicopter Logbook for verification that this helicopter meets these requirements. If the helicopter does not meet these requirements, it must be operated within the limits of Envelope A.

C. Envelope A is the lightest weight envelope with a V_{NE} of 117 mph at sea level. The c.g. and gross weight limits vary as follows:

1. Upper weight limit is 2350 lbs.
2. Forward limit at 92.0 inches.
3. Aft limit varies linearly from 94.6 inches at 2350 lbs to 100.0 inches at 2000 lbs. Aft limit at 100.0 inches below 2000 lbs.

REVISIONS

FAA Approved: 12/31/80
Revised: 7/1/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

D. Envelope B is the next heavier envelope. It has a V_{NE} of 104 mph. The c.g. and gross weight limits vary as follows:

1. Upper weight limit is 2450 lbs.

2. Forward limit varies linearly from 93.8 inches at 2450 lbs to 92.0 inches at 2350 lbs.

3. Aft limit varies linearly from 96.0 inches at 2450 lbs to 99.2 inches at 2240 pounds and 100.0 inches at 2000 lbs.

4. The lower limit corresponds to the upper forward and aft limits of Envelope A.

E. Envelope C has a V_{NE} at sea level of 91 mph. The c.g. and gross weight limits vary as follows:

1. Upper weight limit is 2550 lbs.

2. Forward limit varies linearly from 95.5 inches at 2550 lbs to 93.8 inches at 2450 lbs.

3. Aft limit varies linearly from 97.3 inches at 2550 lbs to 98.4 inches at 2470 lbs and then to 99.2 inches at 2240 lbs.

4. Lower limit corresponds to the upper forward and aft limits of Envelope B.

F. Envelope D is the heaviest envelope. It has a V_{NE} at sea level of 85 mph. The c.g. and gross weight limits vary as follows:

1. Upper weight limit is 2600 lbs.

2. Forward limit varies from 96.3 inches at 2600 lbs to 95.5 inches at 2550 lbs.

3. Aft limit varies linearly from 98.0 inches at 2600 lbs to 98.4 inches at 2470 lbs.

4. Lower limit corresponds to the upper forward and aft limits of Envelope C.

G. The lateral datum line is the centerline of the helicopter. Lateral moment arms are positive right and negative left.

H. Lateral offset moment limits vary with weight. See Figure 6.2.

1. From 2025 lbs to 2600 lbs, limits are -3250 in-lbs and +3700 in-lbs.

2. Below 2025 lbs, see Figure 6.2.

REVISIONS:

FAA Approved: 12/31/80
Revised: 7/1/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

IV. AIRSPEED

Never exceed speed (V_{NE}) - 117 mph, IAS, sea level to 3000 ft density altitude. See Figure 5.1 for variations above 3000 ft and for variations with gross weight/CG.

NOTE: There are four V_{NE}/altitude envelopes which apply to this helicopter. Each envelope corresponds to one of four gross weight/CG envelopes. See Figure 5.1.

NOTE: This helicopter must meet the requirements of Enstrom Specification Drawing #28-100015. See Helicopter Logbook for verification that this helicopter meets these requirements. If the helicopter does not meet these requirements, it must be operated within the limits of Envelope A.

V. ALTITUDE

Maximum approved operating altitude - 12,000 ft density altitude at 2350 lbs. For variations of altitude with gross weight, see Figure 5.1.

NOTE: Takeoffs and landings at 2600 lbs gross weight were demonstrated to 7000 ft density altitude in all wind conditions up to 20 mph. DO NOT EXCEED ENGINE LIMITATIONS.

Takeoffs and landings at 2350 lbs gross weight were demonstrated to 10,000 ft density altitude in all wind conditions up to 15 mph.

Operators should use appropriate caution above 10,000 ft density altitude and in winds greater than 15 mph to insure safe takeoffs and landings.

VI. ROTOR RPM

A. Flight limitations power on:

Minimum: 334 rpm
Maximum: 351 rpm

B. Flight limitations power off:

Minimum: 334 rpm
Maximum: 385 rpm

NOTE: During transient maneuvers, such as simulated power failure during pilot training, the rotor RPM may fall below 334. These maneuvers have been demonstrated with rotor RPM dropping briefly to 280, however, sufficient time and altitude must be available to regain RPM.

See Section 8 for Adjustment Procedures.

FAA Approved: 12/31/80
Revised: 12/14/88

REVISIONS:

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

VII. POWER PLANT LIMITATIONS - LYCOMING HIO-360-F1AD

Engine modified per Enstrom Turbocharger Kit LW-14460.

A. Maximum continuous power: 225 hp, 3050 rpm, 39.0 in. MP, sea level to 12,000 ft.

B. Engine operating rpm:

Minimum: 2900 rpm

Maximum: 3050 rpm

C. Engine idle rpm - clutch disengaged

Minimum: 1450 rpm

Maximum: 1500 rpm

D. Manifold pressure: 39.0 in. Hg, sea level to 12,000 ft

E. Cylinder head temperature: 500°F maximum

F. EGT: 1650°F maximum

G. Fuel: 100/130 aviation grade gasoline (green)
100LL aviation grade gasoline (blue)

H. Fuel mixture setting:

1. 29 in. MP or below

a. Maximum fuel flow - full rich

b. Minimum fuel flow - leaned to 1650°F rich side of peak

2. 29 in. MP to 39.0 in. MP (full rich)

I. Oil temperature: 245° maximum

J. Oil pressure:

100 psi maximum starting and warm up
60-90 psi normal operating
28 psi minimum idling

VIII. TRANSMISSION LIMITATIONS

Transmission oil temperature: 225°F maximum

REVISIONS:

FAA Approved: 12/31/80
Revised: 12/14/88

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

IX. RESTRICTIONS

A. Instrument flight prohibited.

B. No aerobatic maneuvers permitted.

C. Hovering IGE above 10,000 ft density altitude is limited to five minutes.

X. MINIMUM CREW

A. One pilot.

B. Solo from left seat only. (See Supplement No. 6)

XI. INSTRUMENT MARKINGS

A. Rotor tachometer

1. 334 rpm	red line
2. 334-385 rpm	green arc
3. 385 rpm	red line

B. Engine tachometer

1. 2900 rpm	red line
2. 2900-3050 rpm	green arc
3. 3050 rpm	red line

C. Maximum airspeed

1. 85 mph (power off)	blue line
2. 117 mph (power on)	red line

D. Manifold pressure

1. 10 in. to 39 in.	green arc
2. 39.0 in. Hg	red line

3. Overboost light illuminates at 39 in. manifold pressure

E. Engine oil temperature

1. 245°F	red line
2. 120° - 245°F	green arc
3. 60° - 120°F	yellow arc

F. Engine oil pressure

1. 100 psi	red line
2. 60-100 psi	green arc
3. 25-60 psi	yellow arc
4. 25 psi	red line

FAA Approved: 12/31/80
Revised: 12/14/88

REVISIONS:

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

G. Cylinder head temperature

1. 500°F	red line
2. 200° - 500°F	green arc

H. EGT

1650°F	red line

I. Transmission oil temperature

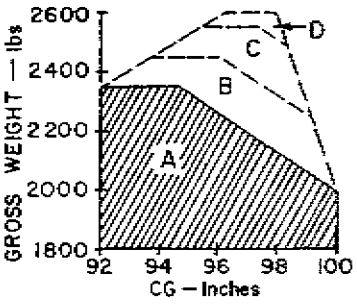
1. 225°F	red line
2. 0° - 225°F	green arc

XII. PLACARDS

A. Placards that are required to be placed in view of the pilot are:

1. THIS HELICOPTER MUST BE OPERATED IN COMPLIANCE WITH THE OPERATING LIMITATIONS SPECIFIED IN THE FAA APPROVED ROTORCRAFT FLIGHT MANUAL

2. PLACARDS FOR 280F V_{NE} (located overhead above center windshield):

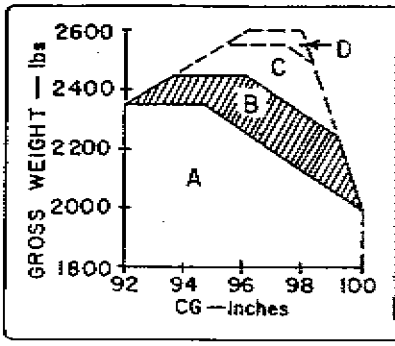


V_{NE} — IAS (MPH) FOR ENVELOPE 'A'

PRESSURE ALTITUDE	OUTSIDE AIR TEMPERATURE °F						
	-20	0	20	40	60	80	100
SEA LEVEL	117	117	117	117	117	117	117
2000	117	117	117	117	117	114	109
4000	117	117	117	115	110	105	96
6000	117	116	111	105	96	87	78
8000	112	107	96	87	78	69	60
10000	99	88	78	69	59		
12000	81	70	60				

28-180045-11

A



V_{NE} — IAS (MPH) FOR ENVELOPE 'B'

PRESSURE ALTITUDE	OUTSIDE AIR TEMPERATURE °F						
	-20	0	20	40	60	80	100
SEA LEVEL	104	104	104	104	104	104	104
2000	104	104	104	104	104	102	98
4000	104	104	104	102	99	94	85
6000	104	103	99	95	85	76	68
8000	100	96	86	76	67	58	
10,000	89	78	68	58			
10,800	81	70	60				

28-180046-11

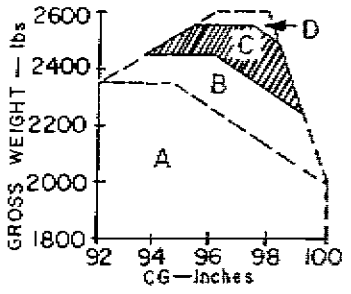
B

REVISIONS:

FAA Approved: 12/31/80
Revised: 12/14/88

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

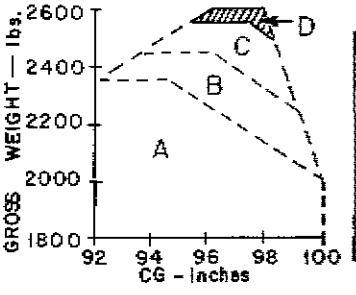


VNE—IAS (MPH) FOR ENVELOPE 'C'

PRESSURE ALTITUDE	OUTSIDE AIR TEMPERATURE °F						
	-20	0	20	40	60	80	100
SEA LEVEL	91	91	91	91	91	91	91
2000	91	91	91	91	91	89	87
4000	91	91	91	90	87	83	74
6000	91	90	87	83	74	65	57
8000	88	85	75	65	56		
9600	81	71	61				

28-180047-11

C



VNE - IAS (MPH) FOR ENVELOPE 'D'

PRESSURE ALTITUDE	OUTSIDE AIR TEMPERATURE °F						
	-20	0	20	40	60	80	100
SEA LEVEL	85	85	85	85	85	84	83
2000	85	85	85	84	83	82	81
4000	85	84	83	82	81	78	69
6000	83	82	81	79	69	59	
8000	81	80	70	60			
9000	80	71	60				

28-180048-11

D

3. NO SMOKING

(This placard not required when approved ashtray is installed.)

4. THIS HELICOPTER IS APPROVED FOR OPERATION UNDER DAY AND NIGHT VFR - NON-ICING CONDITIONS ONLY

5. COLLECTIVE FRICTION TO BE USED FOR GROUND OPERATION ONLY

(This placard to be placed adjacent to the collective friction device.)

B. A placard to be placed in the baggage compartment is as follows:

1. MAXIMUM WEIGHT IN THIS COMPARTMENT IS 108 LBS. OBSERVE C.G. AND GROSS WEIGHT LIMITATIONS

C. STOW FLAT ON FLOOR BEFORE FLIGHT

(This placard to be placed on clutch handle.)

REVISIONS:

FAA Approved: 12/31/80
Revised: 8/29/85

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 3

EMERGENCY AND MALFUNCTION PROCEDURES

REVISIONS:

FAA Approved: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

I. GENERAL

This section describes the system failures and malfunctions that may occur and establishes the emergency procedures used to maintain control and get the helicopter safely on the ground.

II. ENGINE FAILURE

The indications of an engine failure, either partial or complete power loss, are a left yaw and a drop in engine and main rotor rpm. When these conditions are encountered the procedures to be followed are determined by the altitude and airspeed available to establish an autorotative glide, while maintaining control of the helicopter and sufficient rotor rpm for a successful landing.

A. Engine Failure - Altitude above 375 ft AGL.

When engine failure occurs proceed as follows:

1. Enter autorotation (collective full down, throttle to idle and right pedal to trim helicopter).

2. Stabilize at 58 mph glide (best rate of descent speed).

   CAUTION: Due to high rates of descent, sustained autorotation speed is limited to 85 mph to 8200 ft; above 8200 ft see Figure 5.1. Maximum glide distance in autorotation is attained at 80 mph and 334 rotor rpm. Reduce collective to build rpm prior to touchdown.

3. Check engine and rotor rpm. Adjust collective to keep rotor in green arc. If engine is stopped, turn OFF fuel boost pump and place mixture control in ICO position. If altitude and time permit, see Air Restart Procedure, Section 3.2

4. Select landing site.

   NOTE: If engine is running and suitable landing site is not within glide distance, the pilot should attempt to fly the helicopter at reduced power settings to a favorable landing area. The pilot should be prepared for a complete loss of power at any time under these conditions.

5. At approximately 50 ft AGL apply aft cyclic to reduce speed.

REVISIONS:

FAA Approved: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

6. Level helicopter with forward cyclic at an altitude sufficient to provide tail rotor clearance. As helicopter settles toward ground, apply up collective to cushion landing.

7. Maximum recommended ground contact speed on prepared surfaces is 35 mph. Reduce speed on rough surfaces.

CAUTION: Avoid rapid lowering of collective or use of aft cyclic after ground contact or during ground slide.

B. Air Restart

After an engine failure in flight the decision to attempt a restart will depend on the altitude and potential landing areas available.

CAUTION: Helicopter control is primary concern after entering autorotation. DO NOT attempt air restart if control will be jeopardized.

DO NOT attempt air restart when below 3000 ft AGL.

1. Adjust collective as required to maintain rotor rpm in green arc and establish 58 mph autorotative glide.

2. Select landing site.

3. Grip cyclic between knees and with right hand turn fuel boost pump OFF and pull mixture control to ICO.

4. Rotate throttle to start position (start index up).

5. Engage starter.

6. When engine fires, mixture full rich and boost pump ON.

7. Slowly increase throttle until engine and rotor tach needles join in green arc.

C. Engine Failure - Altitude above 10 feet and below 375 ft AGL.

When an engine failure occurs at low altitude and low airspeed, sufficient altitude may not be available to increase rotor rpm. The collective must be adjusted for the conditions in order to reach the touchdown point without excessive rotor droop. The collective reduction will vary from no reduction at zero airspeed and 10 feet to full down collective at higher altitudes and airspeeds. When engine failure occurs proceed as follows:

1. Adjust collective to maintain rotor rpm, throttle to idle position and right pedal to trim helicopter.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

2. Adjust cyclic for autorotative glide.

   NOTE: At higher altitudes and low airspeed use forward cyclic to increase forward speed to approximately 58 mph. At low altitudes and higher airspeed aft cyclic will be required to reduce speed prior to ground contact.

3. At altitude of approximately 50 ft AGL use aft cyclic to reduce forward speed.

4. Level helicopter with forward cyclic at an altitude sufficient to provide tail rotor clearance.

5. As helicopter settles toward the ground apply up collective to cushion landing.

6. Maximum recommended ground contact speed on prepared surfaces is 35 mph. Reduce speed on rough surfaces.

   CAUTION: Avoid rapid lowering of collective or use of aft cyclic after ground contact or during ground slide.

D. Engine - Failure at Hover

Engine failure at a hover is indicated by a sudden yawing of the helicopter to the left. Avoid sideward or rearward movement after engine failure and proceed as follows:

1. Apply right pedal to prevent yawing and align skids in direction of motion.

2. DO NOT reduce collective.

3. As helicopter settles to the ground, add up collective to cushion landing.

III. DITCHING WITHOUT POWER

If engine failure occurs over water, accomplish engine failure emergency procedure and proceed as follows:

A. Unlatch doors.

B. Land. Complete normal autorotational landing in water.

C. As collective reaches full up position and helicopter settles in water, apply full lateral cyclic in direction helicopter tends to roll.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

D. Pilot and passengers exit helicopter when main rotor stops.

WARNING: Clear helicopter as quickly as possible.

IV. DITCHING WITH POWER

If ditching is unavoidable without other recourse, proceed as follows:

A. Descend to low hovering altitude over water.

B. Unlatch both doors.

C. Exit passengers.

D. Hover clear of passengers.

E. Turn off master and alternator.

F. Close throttle and complete hovering autorotation.

G. As collective reaches full up position and helicopter settles into water, apply full right lateral cyclic.

H. Exit helicopter when rotor stops.

WARNING: Clear helicopter as quickly as possible.

V. TURBOCHARGER OR WASTEGATE FAILURE

Turbocharger or wastegate seizure will be evidenced by loss of manifold pressure, if operating at manifold pressures above ambient pressure. It should be possible to maintain level flight at reduced airspeeds and altitudes as the engine should be capable of maintaining manifold pressure equal to ambient pressure. If the turbocharger seizes or the wastegate seizes in the full bypass condition, proceed as follows:

A. Perform a power check to confirm power available for landing.

B. Land as soon as practicable, using running landing (see Section 4, paragraph XVI).

VI. LOW ENGINE OIL PRESSURE

A. Low Oil Pressure and Normal Oil Temperature

If low oil pressure is accompanied by normal oil temperature there is a possibility the oil pressure gauge or relief valve is malfunctioning. This is not necessarily cause for an immediate precautionary landing. Proceed as follows:

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

1. Land at nearest suitable landing area.

2. Inspect for and correct this source of trouble before continuing flight.

B. Total Loss of Oil Pressure

If a total loss of oil pressure is accompanied by a rise in oil temperature, this is a good indication that the engine failure is imminent. Proceed as follows:

1. Reduce engine power immediately.

2. Select a suitable forced landing field and land with power.

VII. TAIL ROTOR MALFUNCTIONS

Because of the many different malfunctions that can occur, success in coping with tail rotor malfunctions depends upon recognition of the condition and use of the proper emergency procedure. The following is a description of the three basic types of malfunctions and the appropriate emergency procedures to follow:

A. Complete Loss of Tail Rotor Thrust

This condition can be caused by a failure of the tail rotor drive system or a failure of the control system which would allow the blades to assume a neutral pitch condition.

1. Hovering flight

When tail rotor thrust is lost in hovering flight the helicopter will rotate rapidly to the right, even with full application of left pedal. Proceed as follows:

a. Roll throttle off to full idle position. Helicopter will slow down or stop rotation.

b. As helicopter settles to ground, cushion landing with up collective (throttle off).

2. During flight near suitable landing area

Helicopter will rotate to right with full application of left pedal. Proceed as follows:

a. Roll throttle full off to idle and enter autorotation.

b. Complete autorotational landing.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

3. During flight

If suitable landing area is not available within autorotative glide distance, pilot should proceed as follows after establishing autorotation at 60 mph or above:

a. Increase collective pitch and power gradually, maintaining 60 to 80 mph until yaw to the right reaches a maximum of 45°.

b. Continue flight in this fashion using cyclic stick for directional control until suitable autorotational landing site is reached.

c. Complete autorotational landing.

B. Fixed Pitch Setting

This is a malfunction involving loss of control resulting in a fixed pitch setting. Whether the nose will rotate left or right depends upon the setting of the pedals when the controls were jammed or locked.

1. Fixed right pedal

If the tail rotor pitch becomes fixed during an approach or low power setting, the nose will turn to the right when power is applied. Proceed as follows:

a. Remove feet from pedals.

b. Maintain 24 inches manifold pressure and 50 mph.

c. Fly to suitable area and complete a shallow power on approach at 50 mph.

d. Adjust throttle and collective pitch so the helicopter touches down straight ahead at an airspeed of 0-10 mph. Reduce throttle and collective cautiously as skids contact surface.

CAUTION: DO NOT abort the emergency landing after airspeed has diminished below 40 mph.

1. Fixed left pedal

If the tail rotor pitch becomes fixed during cruise or high power settings, the helicopter will yaw to the left when power is reduced below 23 in. manifold pressure. Power settings above 23 in. manifold pressure will produce near normal flight conditions at airspeeds above 60 mph. Proceed as follows:

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

a. Fly to suitable landing area at a power setting of at least 23 in. manifold pressure and 60 mph or above.

b. Complete a shallow power-on approach at 60 mph.

CAUTION: DO NOT AUTOROTATE.

c. Adjust throttle and collective pitch so that the helicopter touches down straight ahead at an airspeed of 0 to 10 mph.

d. Reduce throttle and collective pitch cautiously as skid gear contacts surface.

NOTE: Application of power to settings greater than 23 inches manifold pressure will make the helicopter more controllable. Therefore, landing attempt may be aborted and new approach initiated if required.

C. Loss of Tail Rotor or Components

The amount of weight lost will determine the helicopter reaction. If a small amount of weight is lost the situation would be similar to a loss of thrust situation. If a large amount of weight is lost and there is a drastic forward shift in C.G., immediate autorotation is the only emergency procedure available.

VIII. MAIN ROTOR GEARBOX

If the main rotor gearbox temperature exceeds red line or the main rotor gearbox chip detector light comes on, accomplish a power-on approach and landing immediately.

IX. FIRE IN FLIGHT

If fire, smoke, or the odor of smoke is detected in flight, proceed as follows:

A. Land immediately using power-on approach.

B. Turn the master and alternator switch to the OFF position.

C. If smoke obstructs vision, unlatch doors and let them trail open.

D. Shut off engine as soon as helicopter is on the ground.

E. Fuel valve OFF.

F. Pilot and passengers clear the helicopter immediately.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

X. FIRE ON THE GROUND

If fire, smoke, or the odor of smoke is detected, proceed as follows:

A. Shut of engine and all switches.

B. Shut fuel valve OFF.

C. Pilot and passenger clear the helicopter immediately.

XI. ALTERNATOR MALFUNCTION

A malfunction of the alternator will be indicated by zero charge rate or constant discharge on the ammeter. To put the alternator back on the line, proceed as follows:

A. Alternator circuit breaker in.

B. Alternator excite circuit breaker in.

C. Cycle alternator switch.

D. If alternator is not restored or goes off the line again, turn off all nonessential electrical equipment and land as soon as practicable.

XII. ELECTRIC BOOST PUMP FAILURE

Failure of the electric fuel boost pump will be indicated by illumination of red, low boost warning light. The engine will continue to function. If the low boost warning light comes on, land as soon as practicable.

XIII. CLUTCH DISENGAGEMENT LIGHT ON

Should the manual clutch become disengaged during flight, it will result in an instantaneous engine overspeed and severe left yaw at manifold pressures much above idle. These indications will be instantaneous and the pilot should immediately enter autorotation. An indication of a clutch disengagement without engine overspeed or severe yaw may mean that a clutch disengagement is probable or that the microswitch or electrical circuit has malfunctioned. The pilot should proceed as follows:

A. Clutch Disengagement Light on with Motion Cues

1. Enter autorotation and reduce power to idle.

2. Perform autorotative landing.

3. Inspect for and correct the source of trouble before continuing flight.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

B. Clutch Disengagement Light on without motion cues

1. Reduce power and be prepared for sudden clutch disengagement.

2. Land at nearest suitable landing area.

   CAUTION: Be prepared for autorotation should clutch become disengaged.

3. Inspect for and correct the source of trouble before continuing flight.

XIV. ABNORMAL VIBRATIONS

Vibrations in this helicopter can usually be classified as either low frequency or high frequency. Low frequency vibrations are generally caused by the main rotor system while the high frequency vibrations usually orginate from the engine, drive system, or tail rotor. Any abnormal vibrations are an indication that something is not correct and should be referred to a mechanic before further flight. If a vibration suddenly appears during a flight, it is an indication that something has suddenly changed. The helicopter should be landed as soon as practical and inspected to find the cause of the vibration. After the cause of the vibration has been indentified, the pilot and the mechanic can determine whether the helicopter can be safely flown or should be repaired on the spot. An abnormal vibration is reason to get the aircraft down as soon as possible, but the pilot must also use caution and select the safest possible landing site, working around wires, people, and other obstructions.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

XV. LAMIFLEX BEARING FAILURE

A lamiflex bearing failure will cause a rough ride. Initially, this may be only a minor distraction, but in some cases, it can progress quickly to the point where the bearing physically comes apart. In this case, control of one blade will be stiff, the main rotor will be severely out of balance, and aircraft control may be in jeopardy. The following are indications of a lamiflex bearing failure as it progresses.

1. A significant worsening of the ride quality from one flight to the next or from one day to the next for no apparent reason.
2. The aircraft cannot be trimmed at a hover or runs out of trim at maximum forward flight speed when previously there was no problem.
3. The collective suddenly ratchets when moved up and down when previously it had been smooth or the collective suddenly feels heavy.
4. The cyclic suddenly wobbles or moves in a circular motion when previously it had been smooth.
5. The cyclic suddenly starts "chucking," (moving sharply in a left rear to right forward direction in about a 3/4" amplitude with a very crisp motion) especially at high power or high airspeed.

WARNING: This last indication where the cyclic starts sharply moving may be followed within a few minutes by a total failure of the bearing.

Emergency Procedures – Impending Lamiflex Bearing Failure

The following are the procedures to be used in dealing with lamiflex failures. Refer to the preceding paragraph for the description of the failure symptoms.

1. Moderate – Slight worsening in ride or not able to trim:
   a. **LAND** – As soon as practicable. Have all three bearings inspected before the next flight.
2. Serious – Ride continues to get worse or the cyclic or collective start showing symptoms:
   a. **LAND** – Immediately. Have all three bearings inspected before further flight.

FAA Approved: July 9, 2012

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

ENSTROM
HELICOPTER CORPORATION
2209 22nd STREET • MENOMINEE, MICHIGAN 49858-0490 U.S.A.

Emergency Procedures – Total Lamiflex Bearing Failure

The following are the procedures to be used in dealing with total lamiflex bearing failure.

1. Maintain control of the aircraft.
2. Collective – Lower slowly. Commence an 800-900 ft/min descent.

   WARNING: Do NOT autorotate. Aircraft control at the termination of an autorotation may be questionable with a totally failed lamiflex.

3. Airspeed – Reduce to 50-60 MPH.
4. Rotor RPM – Reduce to minimum power on RPM.
5. Maneuvering – Minimize.
6. Land – Perform a running landing. Touch down at or above Effective Translational Lift (ETL), approximately 20 knots if terrain permits.

   WARNING: It may not be possible to control the aircraft in a hover.

8. Shutdown – Complete.

FAA Approved: July 9, 2012

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 4

NORMAL PROCEDURES

REVISIONS.

FAA Approved: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 4 – NORMAL PROCEDURES

I. PREFLIGHT PLANNING

A. Review and be familiar with Section 2, “Operating Limitations.”

B. Calculate weight and balance and review loading information in Section 6, “Weight and Balance.”

C. Obtain weather briefing and file flight plan.

D. Refer to Section 5, “Performance,” to determine if helicopter is within limitations for planned loads, winds, temperature and pressure altitudes.

NOTE: Pilot experience and training is another factor to consider prior to conducting certain flights, even if helicopter is within its operating envelope.

E. Check helicopter and engine log books to determine if helicopter is airworthy.

II. PREFLIGHT INSPECTION

The following checklists are designed to be used as a guide while performing the preflight inspection. Thoroughly familiarize yourself with the Maintenance Manual before utilizing this checklist.

A. Before Preflight Inspection

1. Aircraft tie-downs and covers – Removed and stowed.
2. Publications – Check the cabin for the following items:
   a. Standard Airworthiness Certificate, FAA Form 8100-2.
   b. Certificate of Aircraft Registration, AC Form 8050-3.
   c. Aircraft Radio Stations License FCC Form 556 (if required).

   NOTE: An Aircraft Radio Station License may not be required for the aircraft. Refer to FCC WT Docket No. 96-82 for more information.

   d. 280F Operator’s Manual.
   e. Weight and balance forms (Figures 6.8 through 6.11) for helicopter to be flown. The serial number of the helicopter to be flown should appear on these forms.

   NOTE: The above items are to be carried in the helicopter at all times. Owners and operators of exported helicopters should check with their own Aviation Officials to determine documents required.

3. Master switch – ON.
4. Fuel quantity – check.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

5. Lights – ON then OFF after check. Check landing, anti-collision, position, and interior lights for condition and security.
6. Master switch – OFF.
7. Ignition switch – OFF.
8. All other switches – OFF.
9. Fuel valve – ON.
10. Right side flight controls – check security if installed. Check if properly stowed if removed.
11. Pedals – adjust as required.
12. Fire extinguisher – check for charge, condition, and security.

B. Preflight Inspection – Fuel Management

1. Left fuel tank drain – Drain sample into jar. Verify the fuel grade, check the cleanliness, and check that fuel is free of water.

   WARNING: Sample the left and right fuel tank sumps before checking the fuel filter.

   NOTE: Aircraft should be level or slightly nose down. Rock the aircraft by moving the tail up and down to displace any water or contaminants to the tank sumps. If water is found, rock the aircraft and re-sample. Check the other tank. Repeat until no water is found. Then check the fuel filter.

2. Right fuel tank drain – Drain sample into jar. Verify the fuel grade, check the cleanliness, and check that fuel is free of water.
3. Fuel filter – Secure and drain fuel sample into jar. Verify the fuel grade, check the cleanliness, and check that fuel is free of water.

C. Preflight Inspection – Exterior

1. Left door – check condition, security and latch operation.
2. Windshield – check condition.
3. Pitot tube – unobstructed.
4. Landing light – check condition.
5. Right door – check condition, security and latch operation.
6. Right oleo struts – check extension and security.
7. Right landing gear – check condition and security. Check ground handling wheel in up position and secured.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

8. Right side engine compartment:
   a. Electrical wiring – condition and terminals tight.
   b. Induction system – no obstructions, filter secure, induction hose and lines secure and backfire and alternate air doors free.
   c. Fuel filter – secure.
   d. Fuel lines – secure.
   e. Oil lines – secure and no sign of leakage.
   f. Exhaust – no cracks or signs of leakage.
   g. Cowl door – secure.
9. Upper inspection door:
   a. Swashplate and control rods – check condition and security.
   b. Fuel tank and lines – check for leaks and lines and fittings secure.
   c. Fire curtain – check condition.
10. Kick-in step door:
   a. Belt drive system – check security and condition of idler pulley, main drive belt.
   b. Tail rotor drive shaft – check condition of flex coupling.
   c. Rotor tach drive – check condition.
   d. Cooling fan – check condition.
   e. Check main rotor gearbox sight gauge. Normal level is halfway mark on sight gauge.
11. Right fuel tank – check for leaks, fuel quantity and cap secured.

    NOTE: When checking the fuel quantity, Enstrom recommends using a calibrated dipstick.

    CAUTION: If the fuel level indication on the dipstick is lower than 1/4, take-off is not recommended.

12. From steps:
   a. Check main rotor gearbox filler cap closed.
   b. Check area between fuel tanks for leaks and obstruction to air flow.
   c. Main rotor shaft – check condition.
   d. Main rotor blades – security and condition of leading edge blade tape (if installed), no bond separations, cracks or corrosion. Main rotor retention pins secured.
   e. Check main rotor hub for security of all fasteners, no cracks or obvious damage.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

f. Main rotor pitch links – check for binding or looseness.

g. Main rotor dampers – check for security and no leakage.

13. Baggage box:

    a. Check contents secured. Observe weight limitations.

    b. Open inspection door – check main rotor transmission sight gauge. Normal level is halfway mark on sight gauge.

    c. Door secured.

14. Right static port – check unobstructed.

15. Right tail cone – check condition.

16. Tail rotor drive shaft – condition and security of drive shaft, hangar bearings and flex couplings.

17. Right horizontal stabilizer – check condition and security.

18. Right position/anti-collision light – check security.

19. Tail rotor:

    a. Control cables – check condition and security.

    b. Tail rotor transmission – check for oil leakage and check oil quantity. The minimum oil level required for operation is at half or more than half-filled sight gauge. Check for security of attachment.

    c. Tail rotor guard – check for security and evidence of strike damage.

    d. Pitch change link mechanism – check condition and operation. Check pitch links for binding or looseness and check hardware for security.

    e. Tail rotor hub – check security. Check condition of teeter stop bumpers.

    f. Tail rotor blades – check security. Check for cracks or bond separations. Check strike tabs for evidence of strike.

    g. Position light – check condition and security.

20. Left horizontal stabilizer – check condition and security.

21. Left position/anti-collision light – check condition.

22. Left tail cone – check condition.

23. Left static port – unobstructed.

24. Inspection door:

    a. Belt drive system – engage manual clutch and check belt tensioning system for proper rigging. Disengage manual clutch.

    b. Cooling fan – check condition.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

25. Left fuel tank – check for leaks, check fuel quantity and cap secured.

    NOTE: When checking the fuel quantity, Enstrom recommends using a calibrated dipstick.

    CAUTION: If the fuel level indication on the dipstick is lower than 1/4, take-off is not recommended.

26. Upper inspection door:
    a. Check engine oil quantity – 10 quarts full, 8 quarts minimum for flight.
    b. Swashplate and control rods – check condition and security.
    c. Fuel tank and lines – check for leaks, lines and fittings secure.
    d. Fire curtain – check condition.
27. Left engine compartment:
    a. Turbocharger – check condition and security. Check condition of thermal cover and check area around turbocharger for evidence of heat damage.
    b. Exhaust system and wastegate – check for security and evidence of leakage. Wastegate linkage should be in detent, throttle motion should be free and unrestricted with associated wastegate motion.
    c. Cowl door secure.
28. Left oleo struts – check extension and security.
29. Left landing gear – check condition and security. Ground handling wheel in up position and secured.
30. Main rotor blades – security and condition of leading edge blade tape (if installed), no bond separations, cracks or corrosion. Main rotor retention pins secured.
31. Check operation of all lights for night flight.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

III. BEFORE STARTING ENGINE

A. Seat belts fastened and doors latched.

B. Heater as desired (in for OFF).

C. Check magnetic compass.

D. Altimeter set to field elevation.

E. Radio(s) OFF, frequencies set.

F. All switches OFF.

G. All circuit breakers set (pushed in).

H. Fuel valve ON (pushed in).

I. Flight controls – check for full travel. Center cyclic and pedals.

J. Collective full down and locked.

K. Set throttle friction so that slight effort is required to rotate the throttle.

L. Throttle OFF.

M. Rotor clutch disengaged.

CAUTION: Starting the helicopter with clutch engaged will not damage the rotor system but will severely overload the starter motor.

N. Mixture control in idle cutoff (ICO) position.

IV. STARTING ENGINE

A. Master switch ON.

B. Starter relay CB ON

C. Ignition switch ON to BOTH

D. Throttle open (full).

E. Mixture control full rich.

F. Boost pump ON (1-8 seconds).

NOTE: The length of time the boost pump is run depends upon the temperature of the engine. If the engine is cold soaked in cold temperatures, it may require 8 seconds or more. If the engine has just been run, it may require one second or less.

G. Boost pump OFF.

H. Mixture control to idle cutoff (ICO).

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

I. Throttle closed. Then open to start position (i.e., index up). Reference Section 7, "Aircraft and Systems Description".

CAUTION: Starting the helicopter with clutch engaged will not damage the rotor system but will severely overload the starter motor.

CAUTION: Excessive throttle opening on starting will result in an engine overspeed which results in severe engine damage.

J. Engage starter button. When engine fires, release starter button and push mixture control to full rich.

NOTE: If engine fails to start within 2-3 seconds, release starter button, prime engine using steps D through I.

K. Turn fuel boost pump ON.

L. Check engine oil pressure off "0" mark within 30 seconds.

M. Disconnect APU (if used).

N. Alternator ON.

O. Check engine idle speed; should be 1450 to 1500 RPM.

NOTE: Mixture and RPM must be adjusted for change in base altitude. (Reference the F-28F/280F Series Maintenance Manual Paragraph 13-4, D, (8). Adjustments should be performed by maintenance personnel only.)

P. AV MA, accessory switches ON, and headset(s) ON.

Q. When engine oil pressure is above 25 psi and engine is running smoothly, rotor may be engaged.

V. STARTING HOT OR FLOODED ENGINE

A. Hot engine

1. Prime engine 0-3 seconds.
2. Throttle back to start (i.e., index up).
3. Engage starter button. When engine fires, release starter button and push mixture control to full rich.
4. Proceed with normal starting procedure (para. IV, steps K-Q).

NOTE: If engine fails to start after 2-3 seconds, slowly move mixture control to full rich position while cranking engine. DO NOT engage starter for more than 5 seconds in full rich position.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

B. Flooded engine

1. Ignition switch in **OFF** position, throttle full open and mixture control in ICO.
2. Press starter and crank engine for 3-5 seconds.
3. Throttle closed, then open to start index up position. Ignition switch ON and proceed with normal starting sequence.

VI. ROTOR ENGAGEMENT

A. Check collective down and locked.

CAUTION: Heavy spring capsule forces are present with zero or low rotor rpm, and damage to the helicopter and engine can result if the collective is allowed to rise.

Collective friction is to be used for ground operation only.

B. Check pedals in neutral position.

C. Center cyclic with trim motors.

D. Check area for personnel and obstructions.

E. Maintain throttle in idle position 1450-1500 rpm and slowly engage clutch until engine rpm drops to 1100-1200 rpm.

F. When rotor rpm reaches 100 rpm, fully engage clutch.

NOTE: Clutch disengage warning light will go out when clutch is fully engaged.

G. Place clutch handle in stowed position.

WARNING: Severe engine damage and complete loss of power to rotor system will result if manual clutch is disengaged under any condition other than throttle at idle position.

VII. OPERATIONAL CHECKS

A. Advance throttle to 1800 rpm and wait for cylinder head temperature to reach 200°F.

B. After reaching 200°F cylinder head temperature, slowly advance throttle to 2300 rpm and wait until oil temperature reads 80°F.

C. Advance throttle to 3050 rpm.

D. Check manifold pressure 16-18 inches.

E. Check fuel flow 65-70 lb/hr (engine cold) (50-65 lb/hr engine warm).

1. Adjust the fuel flow as required to attain 50-70 lb/hr (as required) at full rpm (thus raising EGT and reducing manifold pressure).

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

F. Move ignition switch to LEFT position. Maximum 125 rpm drop allowable in 5 seconds and maximum of 100°F rise in EGT. Return switch to BOTH position and let rpm stabilize. Move switch to RIGHT position. Maximum 125 rpm drop and maximum 100°F EGT rise allowable. Return switch to BOTH position.

NOTE: Engine should not run rough when operating on one magneto.

G. Check engine driven fuel pump by turning off boost pump and checking for no change in engine operation. Observe green pressure light out and red fuel pressure light on. Return boost pump switch to ON position.

H. Gently close throttle to split tachometer needles to check proper operation of overrunning clutch. When needles join, return to operating rpm.

VIII. BEFORE TAKEOFF

Check the following items for proper position or indication:

A. Gently close throttle to split tachometer needles to check proper operation of overrunning clutch. When needles join, return to operating rpm.

B. Fuel valve ON (in).

C. Ammeter.

D. Main rotor gearbox temperature.

E. Fuel quantity.

F. Cylinder head temperature.

G. Engine oil temperature.

H. Engine oil pressure.

I. Mixture control set for 50-70 lb/hr fuel flow (as required).

J. Boost pump ON and green light ON.

K. Anti-collision and other lights ON, as required.

L. Clutch warning light – press to test – red light goes out when released.

M. Throttle friction.

N. Release collective lock.

WARNING: Keep hand on collective and maintain down position when lock is disengaged.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

IX. TAKEOFF TO HOVER

A. Cyclic in neutral position.

B. Set engine rpm to 2300 rpm with collective full down.

C. Slowly and smoothly increase collective pitch and adjust throttle as required to maintain RPM in the green arc while raising collective to lift helicopter off the ground.

D. Check EGT 1450-1550°F.

1. If EGT is above 1550°F, land and richen the mixture slightly.
2. If EGT is below 1450°F, the mixture can be leaned for more power.

NOTE: This helicopter is equipped with a mechanical throttle correlation device. The correlator will compensate for changes in collective pitch when manifold pressure is above 25 inches Hg and will maintain RPM within the normal operating range for normal hover maneuvering.

NOTE: Hovering IGE above 10,000 ft density altitude is limited to 5 minutes.

CAUTION: Avoid maneuvers that require full pedal travel or rapid pedal reversals.

X. NORMAL TAKEOFF

A. Align helicopter with desired takeoff course at a stabilized hover height of approximately 2 ft.

B. Check power required to hover.

C. Smoothly apply forward cyclic to begin acceleration into effective translational lift.

D. As the helicopter begins forward movement, maintain altitude by increasing collective pitch.

NOTE: Adjust acceleration rate so approximately 1-2 inches of manifold pressure over hover power is required. Maintain 2 ft hover altitude or lower altitude if permitted by safe obstacle or terrain clearance.

E. When effective translational lift has been attained, adjust throttle as necessary to maintain RPM within the normal operating range. Establish a positive rate of climb. See Height-Velocity Diagram, Figure 5.5, for recommended takeoff profile.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

XI. MAXIMUM PERFORMANCE TAKEOFF

A. Stabilize at 2 ft hover aligned with desired takeoff course. Check hover power.

B. Smoothly apply forward cyclic to begin acceleration into effective translational lift.

C. As the helicopter begins forward movement, increase collective pitch to maintain 2-5 ft skid height and 3050 RPM.

CAUTION: DO NOT exceed 39.0 inches of manifold pressure.

NOTE: Since the 280F is equipped with a full-time turbocharger, the turbocharged engine is equipped with an overboost warning light on the instrument panel to warn the pilot of an overboost condition. Transient overboost conditions, which may trigger the warning light, may not show as overboost conditions on the manifold pressure gauge. The manifold pressure gauge red line is the determining factor in ascertaining the magnitude of an overboost condition. Subject overboost conditions must be logged in the engine log and inspections performed per Lycoming Bulletin 592.

D. After attaining translational lift, adjust throttle as necessary to maintain rpm at 3050 RPM. Continue level acceleration to 35 mph, then apply aft cyclic to allow the helicopter to climb and accelerate to best rate of climb speed. Maintain constant airspeed. Climb at best climb speed to clear barrier.

XII. MAXIMUM PERFORMANCE TAKEOFF IN CONFINED AREA

[DELETED]

XIII. Cruise

A. Maintain 3050 RPM and 29 inches manifold pressure, or less, in level flight.

B. Set cyclic trim.

C. Lean fuel mixture to approximately 90 lb/hr at 29 inches manifold pressure.

D. Monitor EGT.

NOTE: Allow a few minutes for temperature to stabilize. DO NOT exceed 1650°F EGT. Make fine adjustments to attain desired fuel flow and cross check cylinder head temperature and oil temperature. If temperatures are too high, enrich mixture in 25°F increments until temperatures remain in green arc.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

E. Any increase in power setting above 29 inches should be accompanied by setting the mixture to full rich.

CAUTION: Avoid maneuvers which require full pedal travel or rapid pedal reversals.

XIV. PRACTICE AUTOROTATIONS

A. Assure that helicopter is in a position to reach a suitable landing area in autorotative glide.

B. Airspeed between 50 and 80 mph.

C. Lower collective to full down position and needle will split (i.e., DO NOT ADJUST THROTTLE). In the event a power recovery is desired, raise collective to flight condition. RPM will return to original setting.

D. Monitor rotor tachometer and adjust collective as required to maintain rotor speed in green arc.

E. If touchdown autorotation is desired, roll off throttle to idle position for landing before raising collective.

CAUTION: AVOID throttle chops to full idle at altitudes 7,000 ft above base altitude where engine idle was adjusted. Engine idle speeds at altitude will be less than those set at base altitude conditions and engine stoppage is possible.

F. Level aircraft and cushion landing by raising collective.

NOTE: If power recovery is desired, throttle must be added.

CAUTION: When making a power recovery, avoid rapid throttle movements until the rotor and engine tachometer needles are joined to prevent damage to the free-wheeling clutch.

XV. LANDING

A. Mixture control full rich.

B. Maintain RPM within normal operating range as collective is reduced.

C. Landing light ON, if required.

NOTE: The nose light is operated by a switch on cyclic and can be adjusted by the pilot in flight. The adjustment handle is on the cabin floor to the left of the cyclic. The bottom landing light (if so equipped) is operated by a switch on the switch panel and is fixed for best autorotative glide path.

D. Adjust collective and altitude to establish 8° to 10° approach angle. Adjust airspeed to 60 mph.

REVISIONS:
FAA Approved: 12/31/80
Revised: 12/14/88

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

E. As the landing area is approached, reduce the airspeed and rate of descent until a zero ground speed hovering altitude of 2-5 feet is attained.

NOTE: Hovering IGE above 10,000 ft density altitude is limited to 5 minutes.

XVI. RUNNING LANDING

A. Use a shallow approach angle.

B. Maximum recommended ground contact speed on smooth surface is 35 mph. Reduce speed on rough surfaces.

CAUTION: Avoid rapid lowering of collective pitch after ground contact, as rapid deceleration and nose down pitching may result.

XVII. AFTER LANDING

A. Collective down and locked.

B. Landing lights OFF.

C. Radio(s) OFF.

D. Reduce throttle to 2000 rpm for one minute.

E. Throttle to idle (1500 rpm).

F. Clutch disengaged.

CAUTION: Clutch disengagement with throttle open will result in engine overspeed. Clutch disengagement is signaled by a red warning light on the instrument console.

G. Idle engine at 1600 rpm for 2 minutes, or until cylinder head temperature cools to 300°F.

H. Boost pump OFF.

I. Mixture control to idle cutoff position.

J. Ignition switch OFF.

K. Master and all other switches OFF.

L. Fuel valve OFF (out).

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

XVIII GENERAL OPERATING PROCEDURES

Throughout the flight envelope, avoid maneuvers which require full tail rotor pedal input or rapid tail rotor reversals. Although this type of pedal input may be necessary in some normal operations such as hovering downwind or hovering in gusty conditions, the pilot should avoid excessive pedal movement except as necessary for normal flight conditions.

REVISIONS:

FAA Approved: 12/14/88

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 5

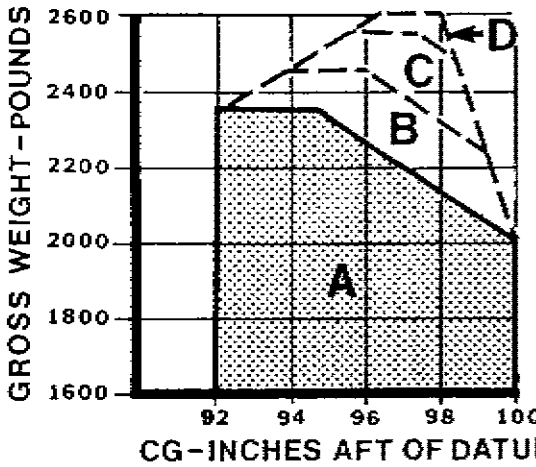
PERFORMANCE

REVISIONS.

FAA Approved: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED



The solid V_{NE}/altitude curve shown below applies only to operation with the c.g. within the shaded area shown at left (Envelope A). For operation with the c.g. in other areas, see the appropriate V_{NE} envelope.

EXAMPLE: Helicopter c.g. is 96.0 inches at 2000 lbs, use Envelope A V_{NE}.

Helicopter c.g. is 96.5 inches at 2300 lbs, use Envelope B V_{NE} (Figure 5.1B).

NOTE: Use Figure 6.1 to determine actual location of c.g.

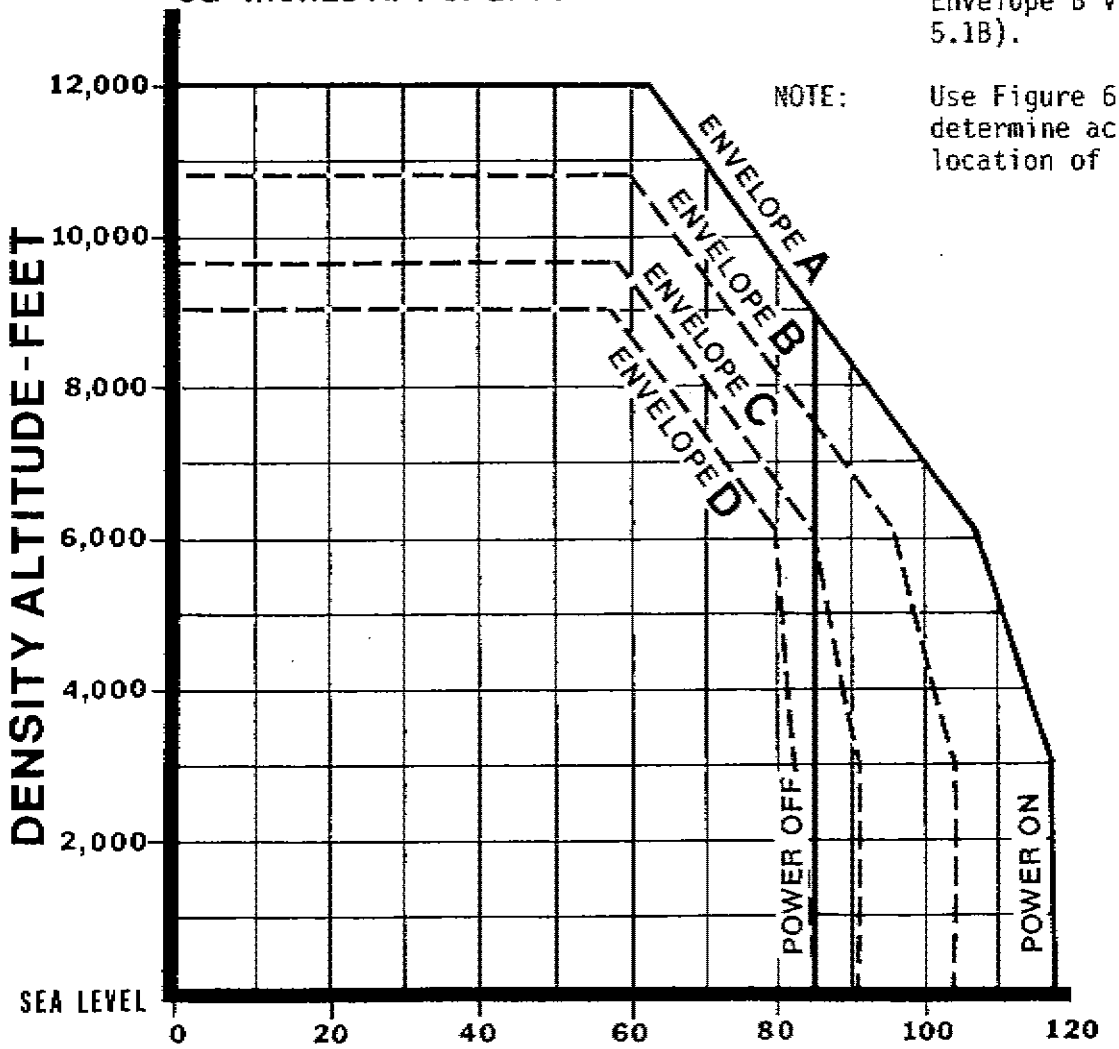


FIGURE 5.1A

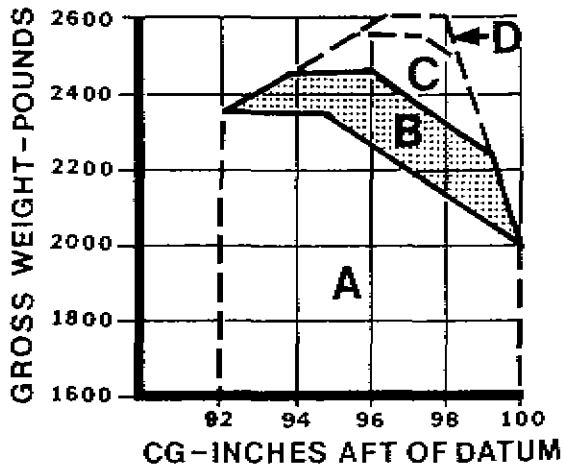
V_{NE} Variation with Density Altitude for Envelope A

REVISIONS:

FAA Approved: 12/31/80 Revised: 12/14/88

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED



The solid V_{NE}/altitude curve shown below applies only to operation with the c.g. within the shaded area shown at left (Envelope B). For operation with the c.g. in other areas, see the appropriate V_{NE} envelope.

EXAMPLE: Helicopter c.g. is 95.0 inches at 2400 lbs, use Envelope B V_{NE}.

Helicopter c.g. is 98.0 inches at 2400 lbs, use Envelope C V_{NE} (Figure 5.1C).

NOTE: Use Figure 6.1 to determine actual location of c.g.

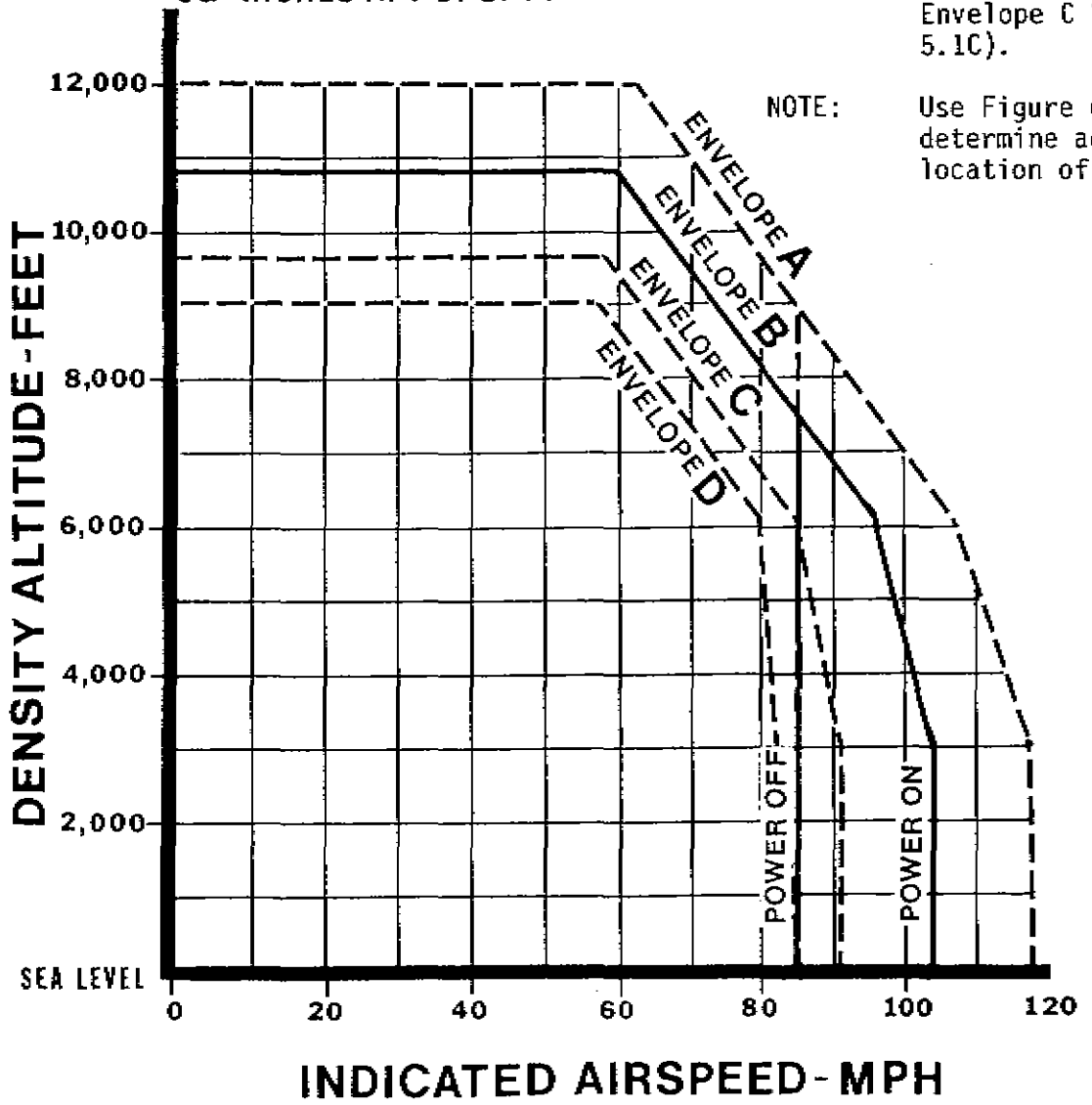


FIGURE 5.1B

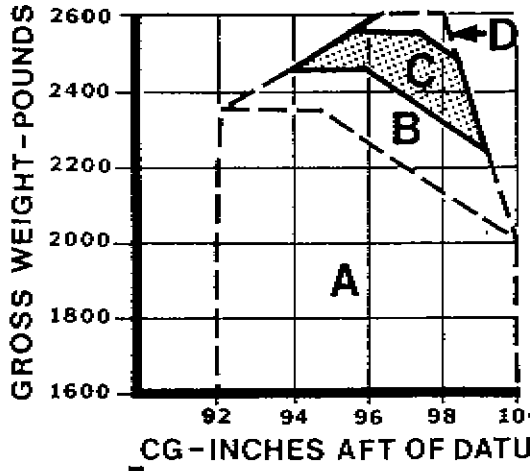
V_{NE} Variation with Density Altitude for Envelope B

REVISIONS:

FAA Approved: 12/31/80 Revised: 12/14/88

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED



The solid V_{NE}/altitude curve shown below applies only to operation with the c.g. within the shaded area shown at left (Envelope C). For operation with the c.g. in other areas, see the appropriate V_{NE} envelope.

EXAMPLE: Helicopter c.g. is 98.6 inches at 2300 lbs, use Envelope C V_{NE}.

Helicopter c.g. is 93.0 inches at 2350 lbs, use Envelope A V_{NE} (Figure 5.1A).

NOTE: Use Figure 6.1 to determine actual location of c.g.

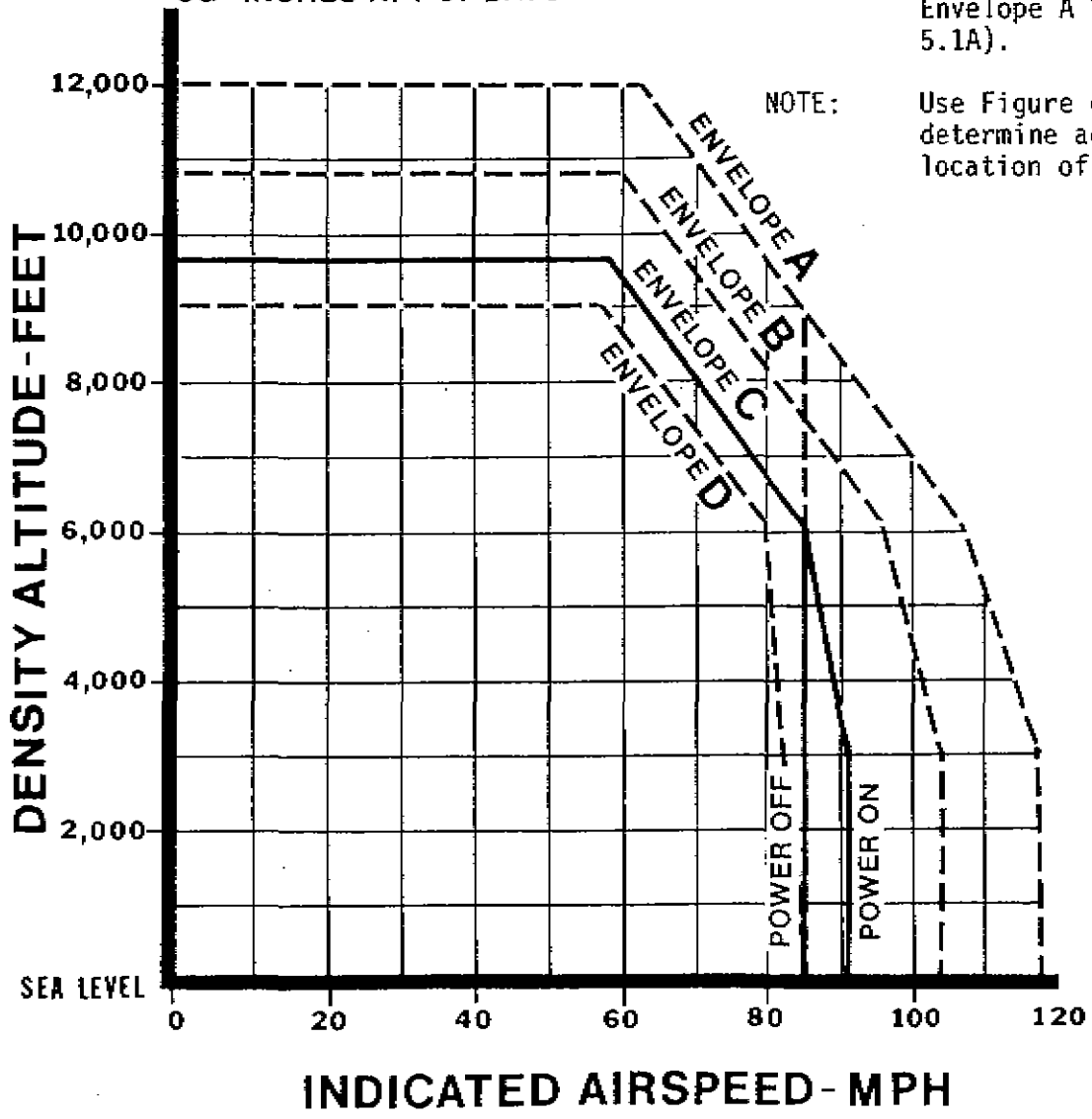


FIGURE 5.1C

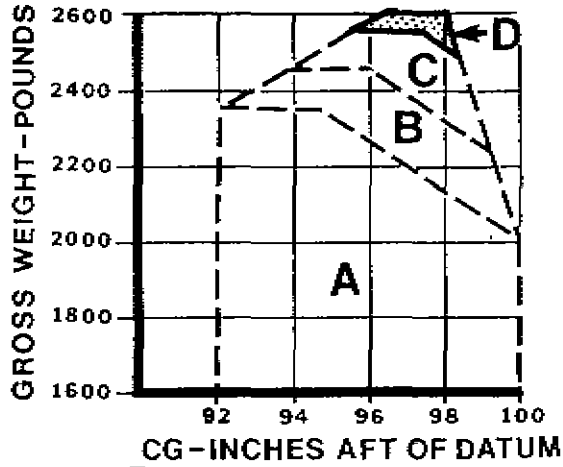
V_{NE} Variation with Density Altitude for Envelope C

REVISIONS:

FAA Approved: 12/31/80 Revised: 12/14/88

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED



The solid V_{NE}/altitude curve shown below applies only to operation with the c.g. within the shaded area shown at left (Envelope D). For operation with the c.g. in other areas, see the appropriate V_{NE} envelope.

EXAMPLE: Helicopter c.g. is 97.0 inches at 2560 lbs, use Envelope D V_{NE}.

Helicopter c.g. is 96.0 inches at 2550 lbs, use Envelope C V_{NE} (Figure 5.1C).

NOTE: Use Figure 6.1 to determine actual location of c.g.

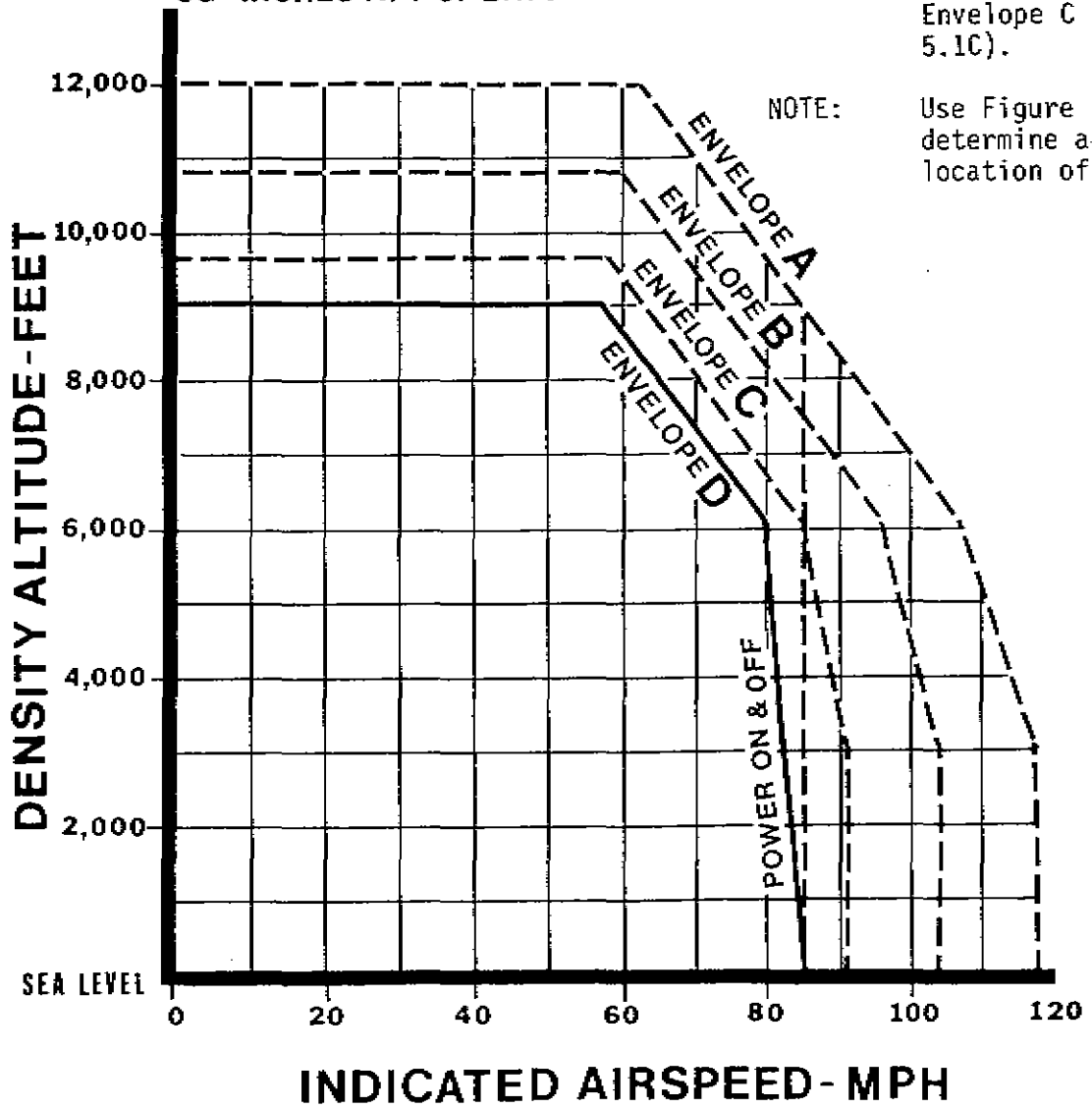


FIGURE 5.1D

V_{NE} Variation with Density Altitude for Envelope D

REVISIONS:

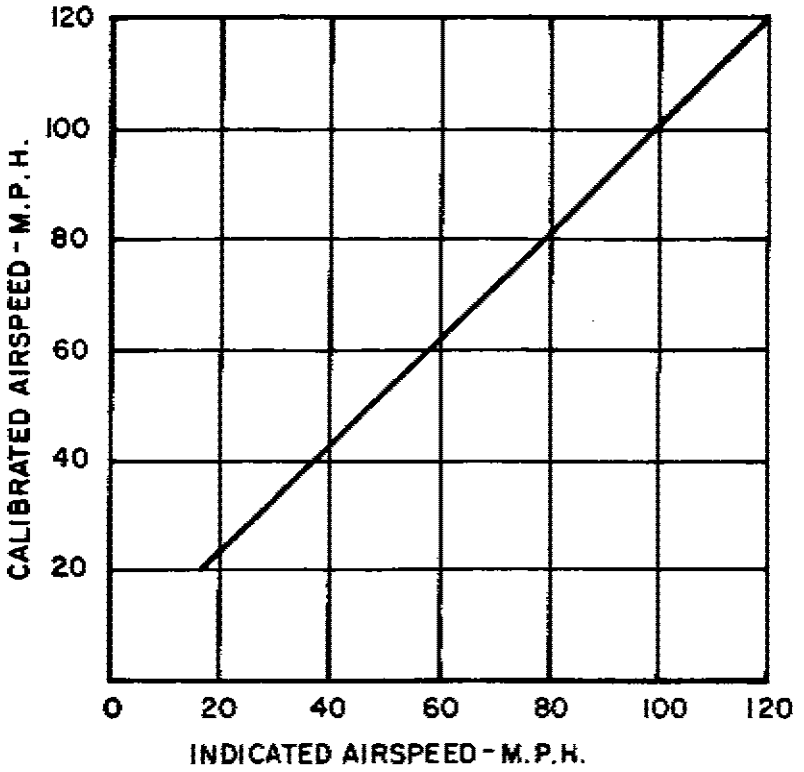
FAA Approved: 12/31/80 Revised: 12/14/88

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

ENSTROM 280F

AIRSPEED CALIBRATION



NOTE: INDICATED SPEEDS BELOW 20 M.P.H. ARE NOT RELIABLE.

FIGURE 5.2

FAA Approved: 12/31/80
Revised: 7/1/84

REVISIONS:

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

ENSTROM F-28F

HOVER CEILING IN-GROUND EFFECT

2 FT SKID HEIGHT

350 ROTOR RPM

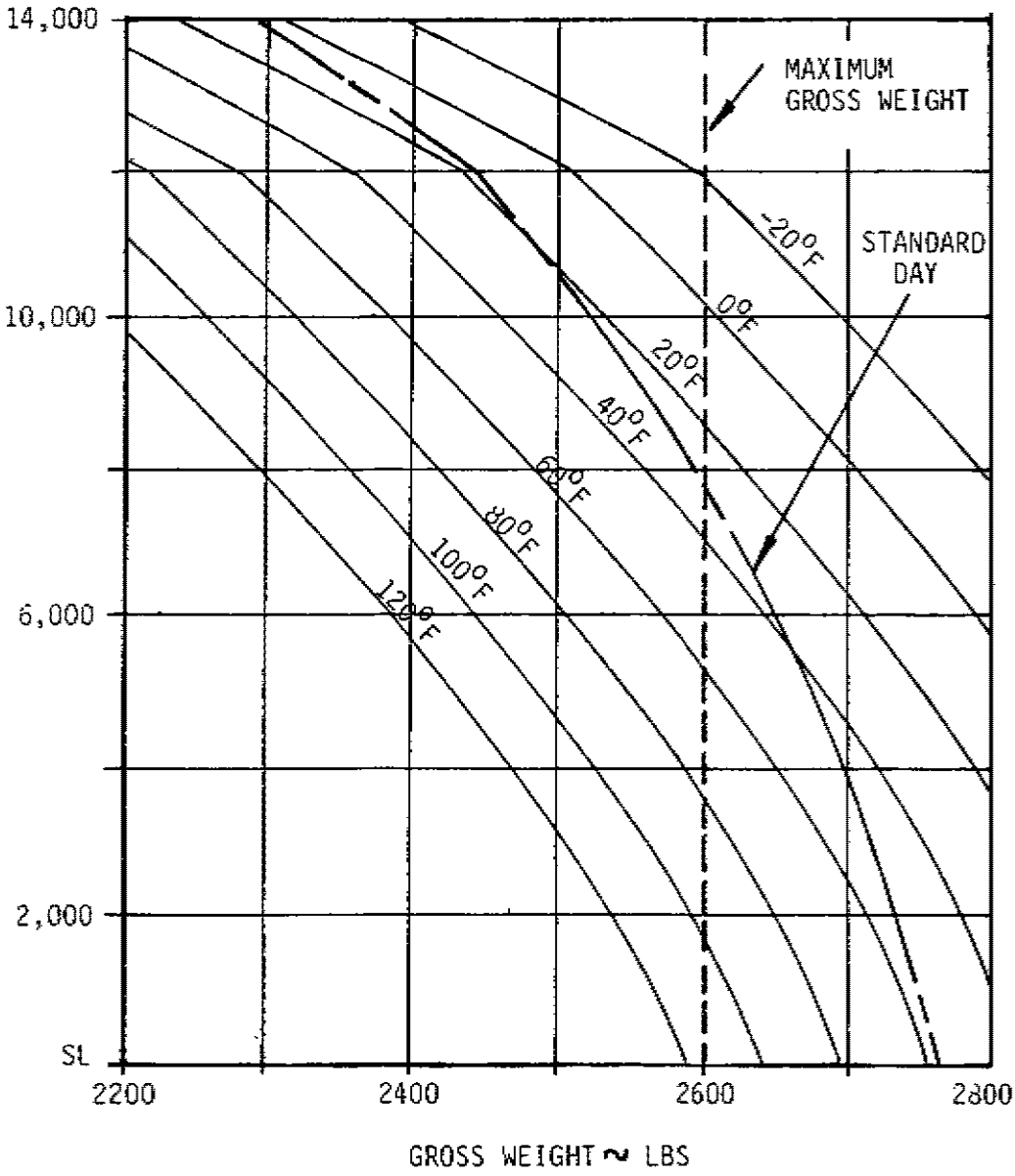


FIGURE 5.3

FAA Approved: 12/31/80
Revised: 7/1/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

ENSTROM F-28F
HOVER CEILING OUT-OF-GROUND EFFECT

40 FT SKID HEIGHT
3050 ROTOR RPM

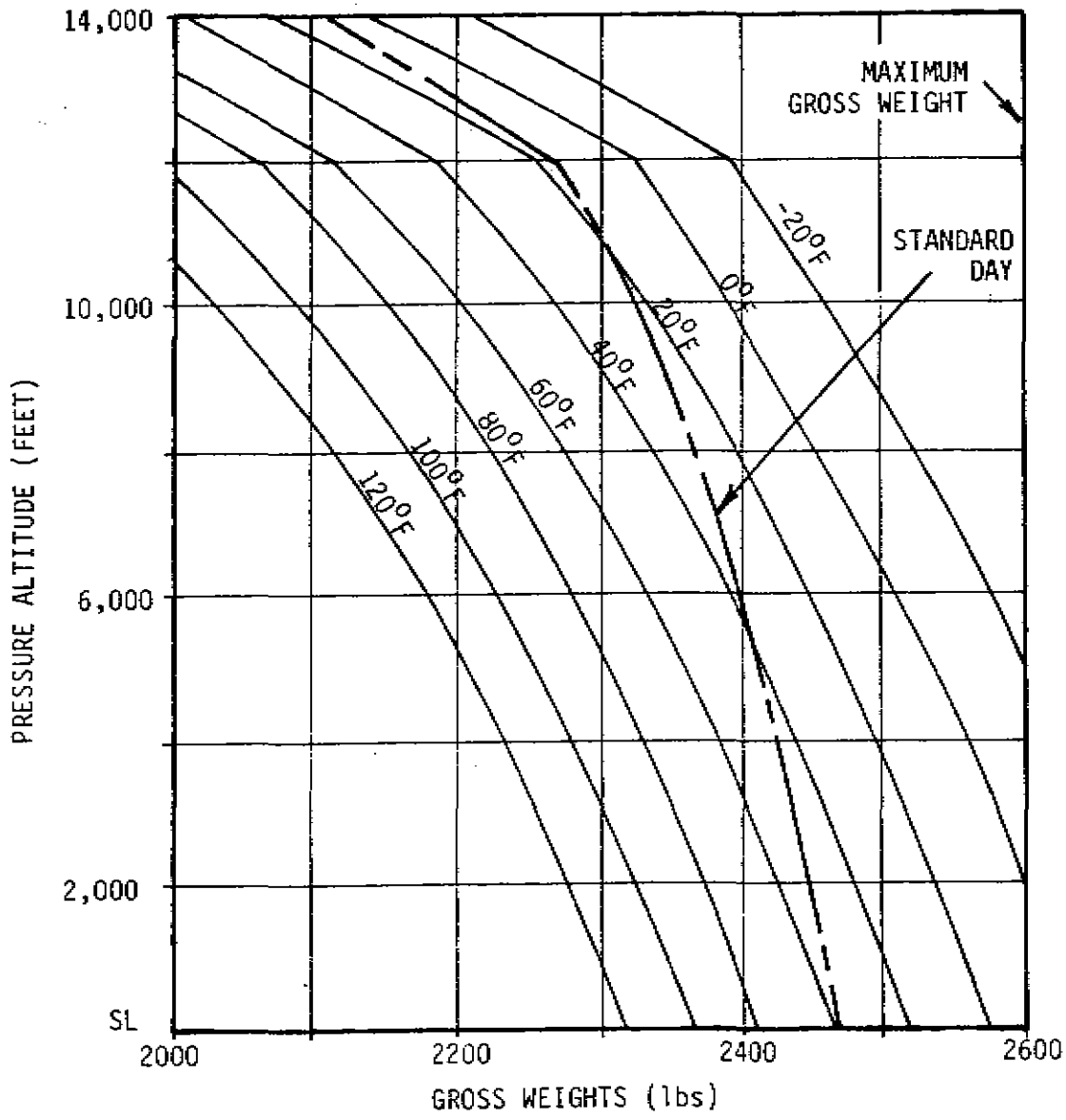


FIGURE 5.4

FAA Approved: 12/31/80
Revised: 7/1/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

HEIGHT VELOCITY DIAGRAM

2350 LBS GROSS WEIGHT

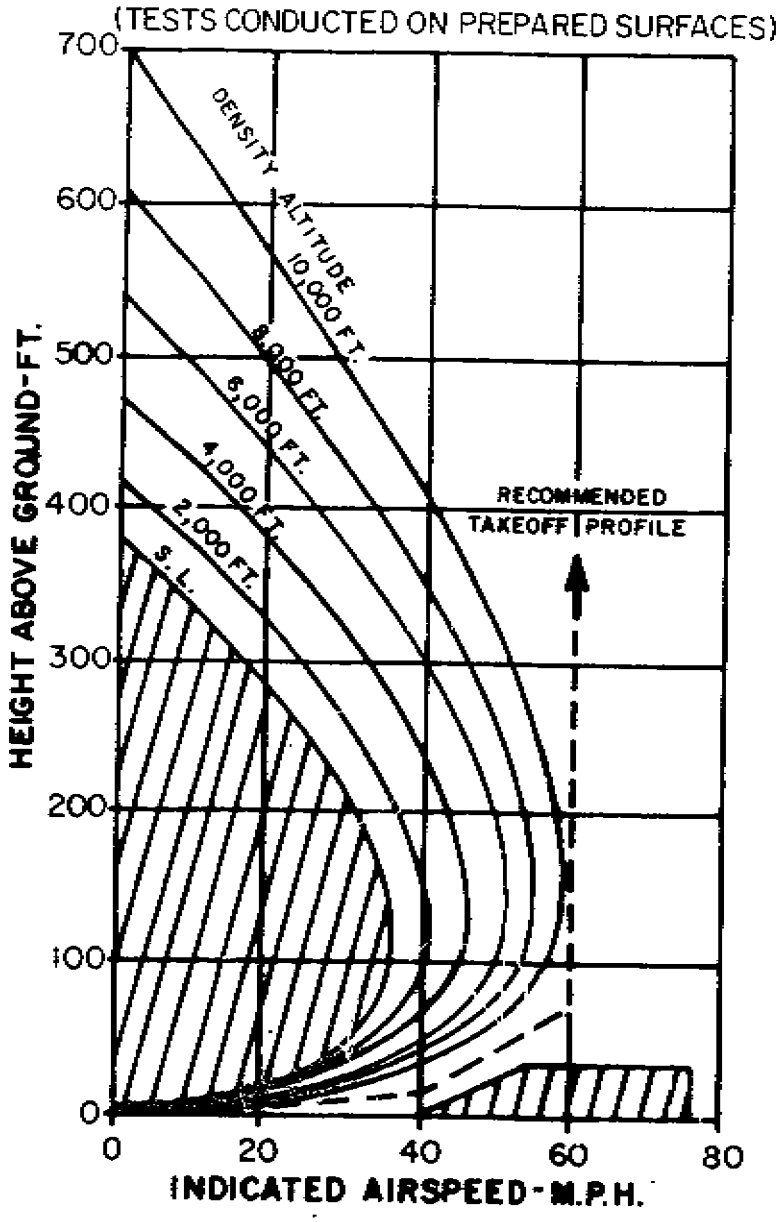


FIGURE 5.5

FAA Approved: 12/31/80
Revised: 7/1/84

REVISION

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

EFFECT OF LOADING ON CHOICE OF H-V ENVELOPE

The H-V curves presented in Figure 5.5 are valid for operations at 2350 lb gross weight for the specific density altitude conditions presented. For operation at other than 2350 lb gross weight, determine the proper H-V curve to be used for the intended gross weight and density altitude for the flight, from the curves presented in Figure 5.6 below. For operations above 2500 lb gross weight, use the H-V curves presented in Figure 5.7 in place of Figures 5.6 and 5.5.

Example: (1) A gross weight of 2000 lbs and 3900 ft H_d would allow the use of the sea level envelope.

(2) A gross weight of 2200 lbs and 4500 ft H_d would require a 2800 ft curve. To be conservative, use the next higher curve, 4000 ft.

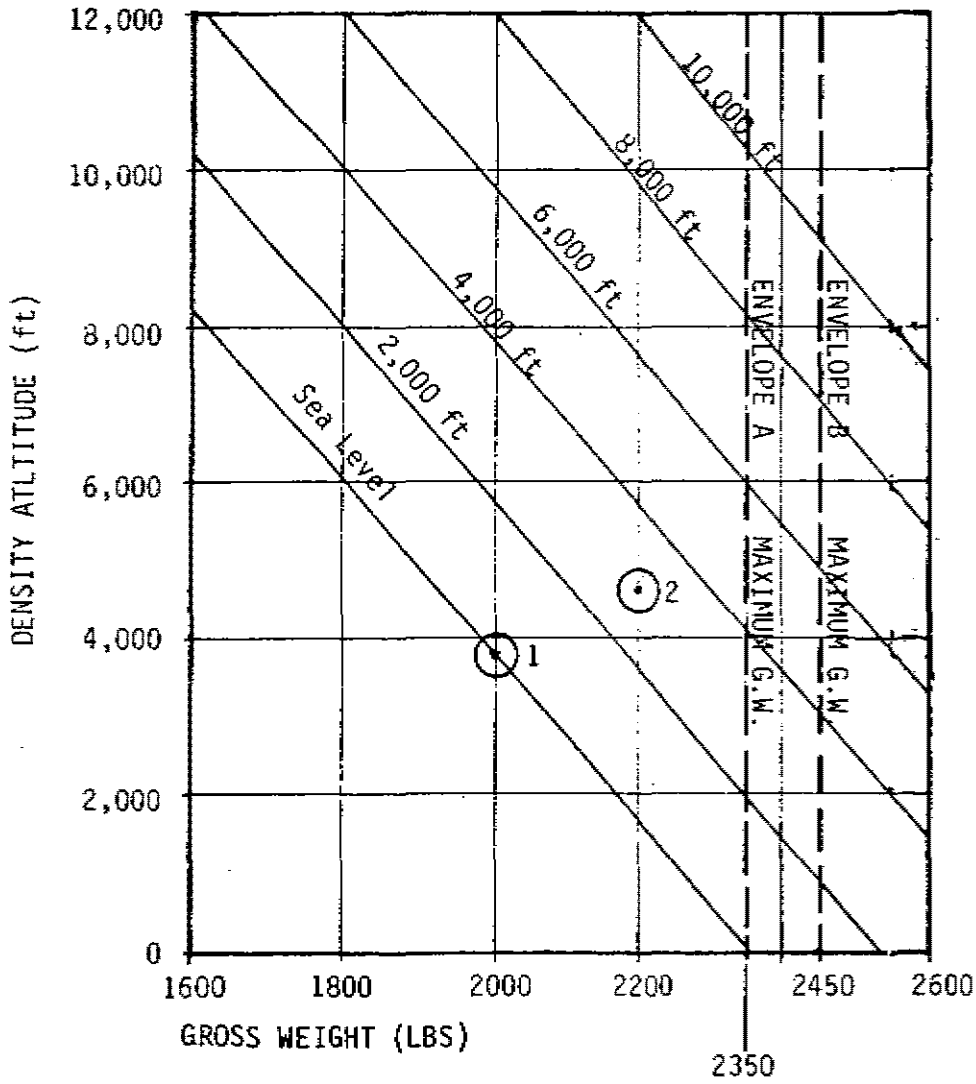


FIGURE 5.6

REVISIONS

FAA Approved: 12/31/80
Revised: 7/1/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

HEIGHT VELOCITY DIAGRAM

2600 LBS GROSS WEIGHT

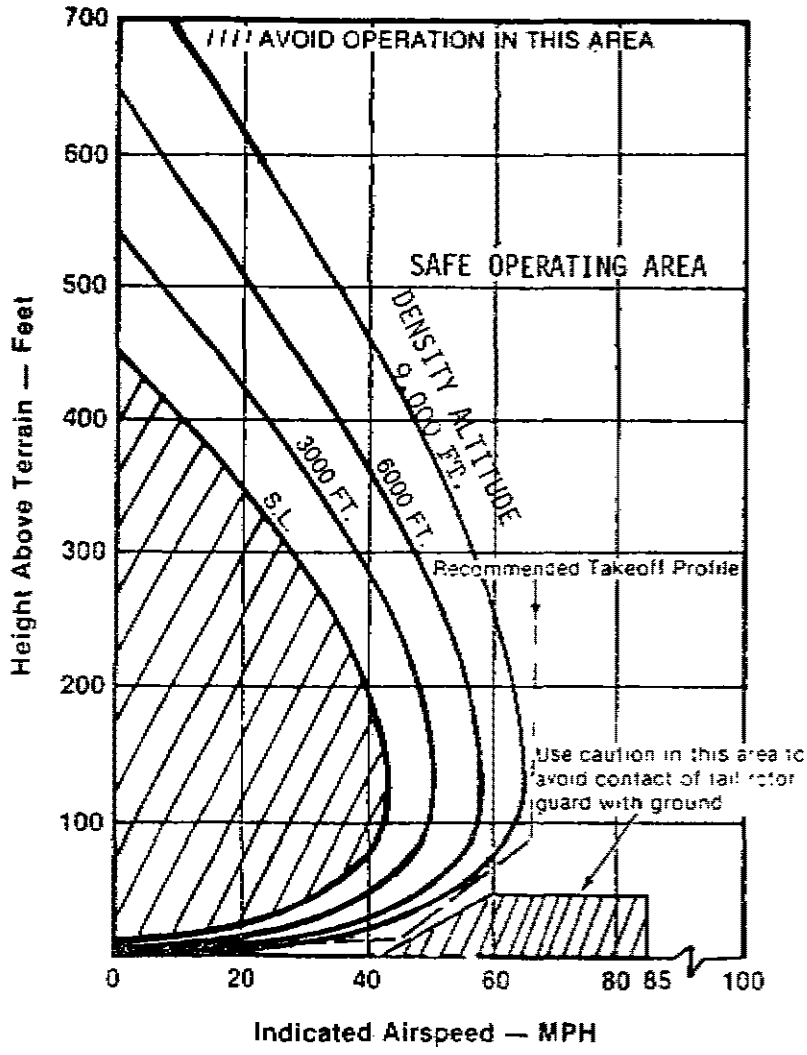


FIGURE 5.7

NOTE: Altitude operations may also be limited by V_{NE} and OGE hover. Cross check Figures 5.1 and 5.4 for intended operations when using this figure.

FAA Approved: 7/1/84

REVISIONS:

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

DENSITY ALTITUDE CHART

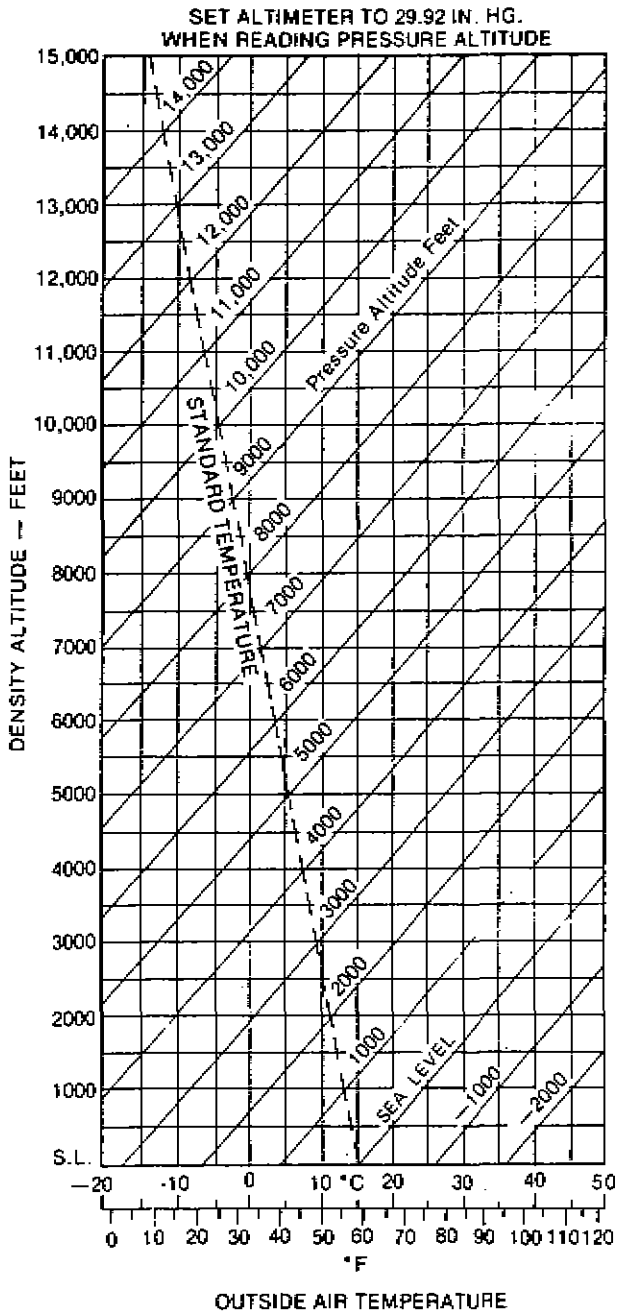


FIGURE 5.8

FAA Approved: 12/31/80
Revised: 7/1/84

REVISION

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

RATE OF CLIMB/DENSITY ALTITUDE
2350 LBS GROSS WEIGHT

BEST RATE OF CLIMB SPEED VARIES WITH ALTITUDE
57 MPH IAS AT SL DECREASING TO 48 MPH IAS AT 12,000 FT H_d

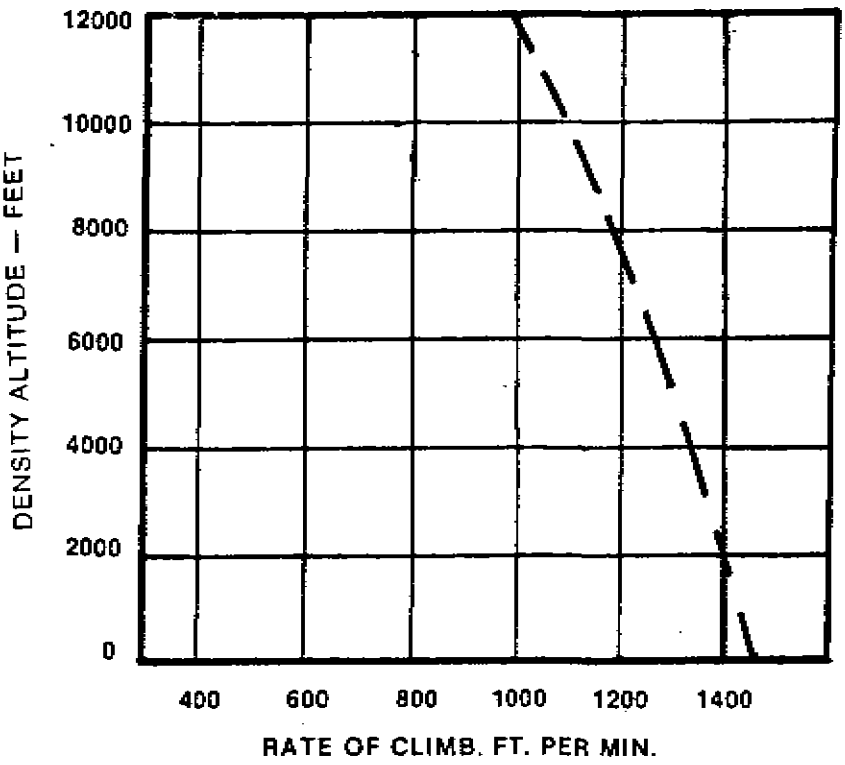


FIGURE 5.9

REVISIONS:

FAA Approved: 12/31/80
Revised: 7/1/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 6

WEIGHT AND BALANCE

REVISIONS

Issued: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 6 - WEIGHT AND BALANCE

I. GENERAL

This helicopter must be flown within the weight and center of gravity limits stated in Section 2, Operating Limitations. This helicopter must meet the requirements of Enstrom Specification Drawing #28-100015 (see Limitations Section). The helicopter empty weight, empty weight c.g., total basic weight and basic weight c.g. are found on Form F-168A. Removal or installation of approved optional equipment will change the helicopter weight and c.g. These changes shall be recorded on Form F-165A, and a running basic total weight, arm, and moment will be maintained. The pilot will use this running basic total when performing calculations to insure the helicopter is loaded properly.

II. APPROVED CENTER OF GRAVITY ENVELOPES

A. Longitudinal C.G.

1. Station zero located 100.0 inches forward of centerline of main rotor hub.

2. Longitudinal c.g. range variable with gross weight from 92.0 inches to 100.0 inches (see chart, Figure 6.1).

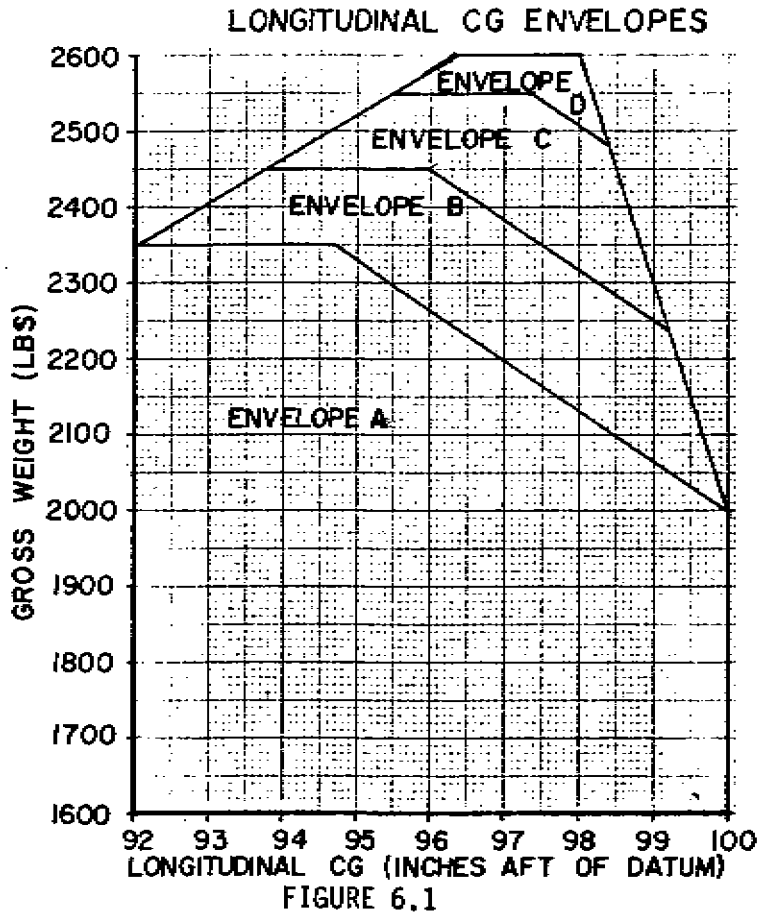


FIGURE 6.1

REVISIONS.

Issued: 12/31/80
Revised: 7/1/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

B. Lateral Offset Moment

1. Centerline of helicopter is 0 inch lateral moment arm. Looking forward, moment arms left of centerline are negative.

2. Lateral c.g. locations:

   a. Two people on board:

      (1) Left seat (pilot) -13.5

      (2) Right seat (co-pilot) +13.5

   b. Three people on board:

      (1) Left seat (pilot) -13.5

      (2) Center passenger + 3.0

      (3) Right passenger +20.5

3. Approved lateral offset moments vary with gross weight from -3250 in-lb to +3700 in-lb (see chart, Figure 6.2). Lateral offset is the same for all V_{NE} envelopes.

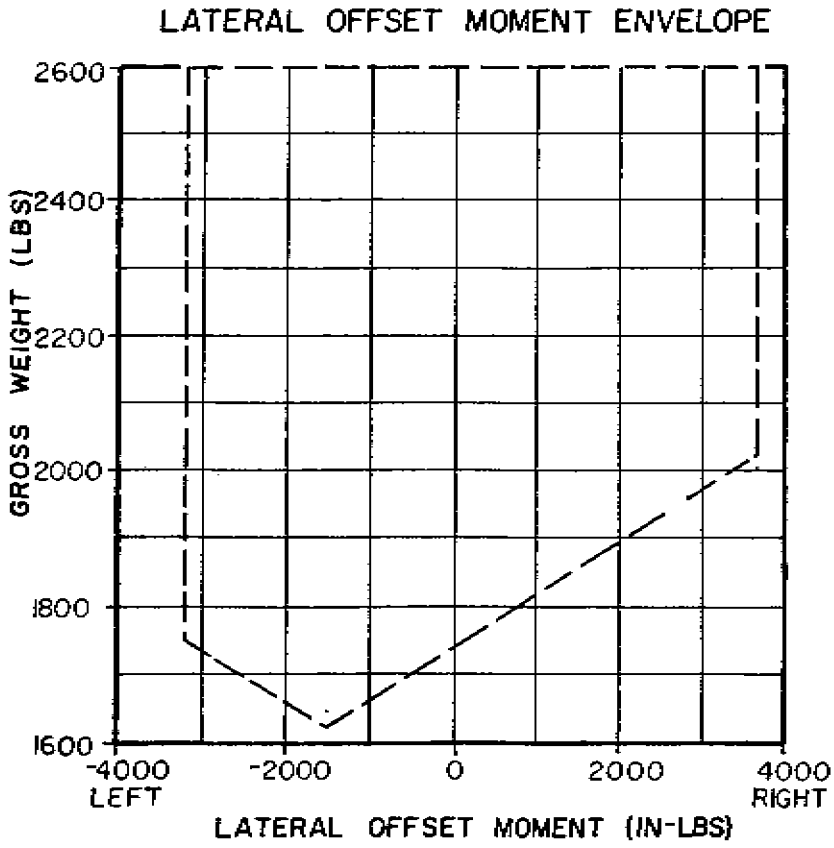


Figure 6.2

REVISIONS

Issued: 12/31/80
Revised: 7/1/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

III. WEIGHING THE 280F HELICOPTER

NOTE: Should a loss of records or major repair warrant re-weighing the helicopter, the following procedures should be followed:

A. Tools and Equipment

1. Tape measure
2. Two scales - 1000 lb capacity
3. Scale - 100 lb capacity
4. Bubble level
5. Work stand

B. Procedure

1. Clean helicopter - remove rags, charts, etc.
2. Drain fuel, check all other operating fluids full.
3. Move helicopter inside closed building.
4. Check for proper installation of accessory items.
5. Close and secure both doors.
6. Align one main rotor blade over tail cone.
7. Hoist or jack helicopter to height to clear scales.
8. Position a pipe nipple in the center of left and right 1000 lb capacity scales. Place scales under landing skids so nipples will contact skid gear at a point 17.7 inches aft of centerline of the forward 3 inch diameter cross tube (Station 93.4).

   NOTE: See Figure 6.3 for locating fulcrum by using Enstrom tool number T-1794. This tool may be purchased from Enstrom Helicopter Service Department.

9. Locate the 100 lb capacity scale at the center line of the tail rotor output shaft (see Figure 6.4).
10. Adjust height of tail to level helicopter. Level checked at left lower pylon tube. Lateral level checked at lower forward pylon tube.
11. When helicopter is level read the scales and enter weights on Weight Chart, Figure 6.7.

    CAUTION: Weight and measurement readings are critical. Double check results.

REVISIONS.

Issued: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

12. Remove helicopter from scales.

    NOTE: DO NOT remove curbing, nipples, blocks, etc. from scales. Weigh these items and enter weights in tare column on Figure 6.7.

13. Subtract tare from scale readings and enter net weights.

14. Enter arms and multiply by weights to get moments.

15. Total weights and moments.

16. Using formula on bottom of Figure 6.7, calculate c.g.

17. Transfer the total figures for weight, c.g. or arm and moment from Figure 6.7 to the top of Form F-168A.

18. Add any missing standard equipment in applicable column.

19. Enter where noted and subtract from weight (as weighed) all optional and surplus equipment and engine oil.

20. Add to the above, twelve (12) lbs for unusable fuel (one [1] gallon per standard fuel tank - two [2] tanks).

21. Calculate actual empty weight, moment and c.g. or arm.

22. Add to these basic figures the weight, c.g. or arm and moment for engine oil and all optional and surplus equipment. This result is the total basic weight, c.g. or arm and moment to be entered at the bottom of Form F-168A and in the applicable blanks at the top of Form F-165A.

    NOTE: Form F-165A will not be used to itemize all optional equipment and/or modifications made to the helicopter to re-establish a running basic total of weight, arm, and moment.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

WEIGHT AND BALANCE
TOOL POSITIONING

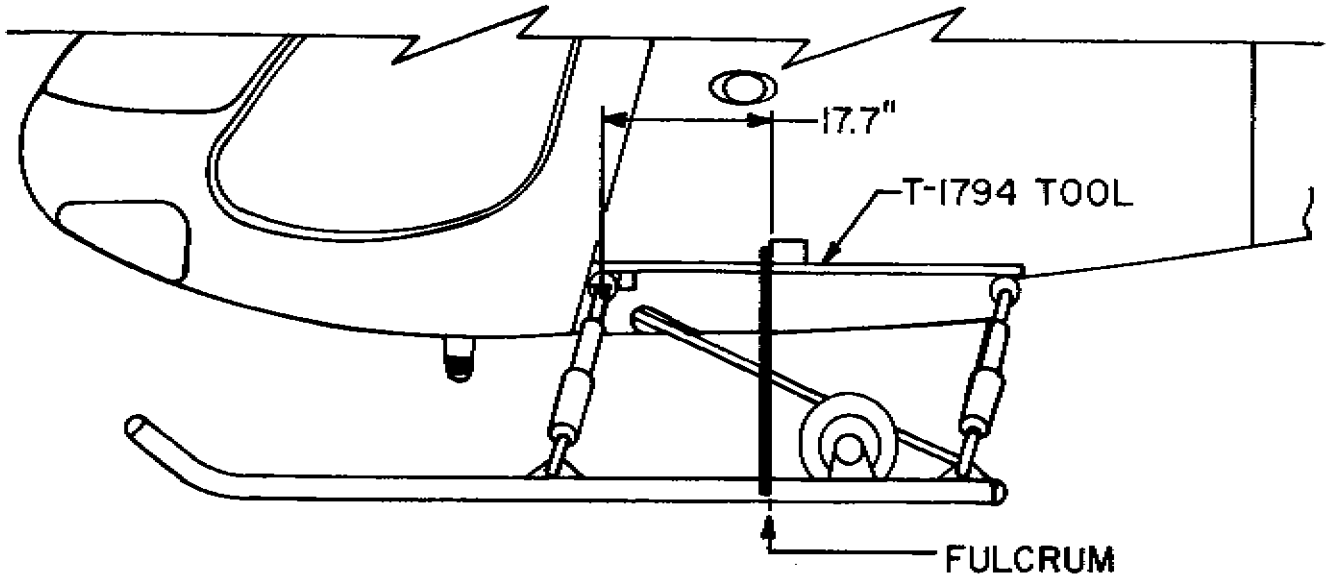


FIGURE 6.3

REVISIONS:

Issued: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

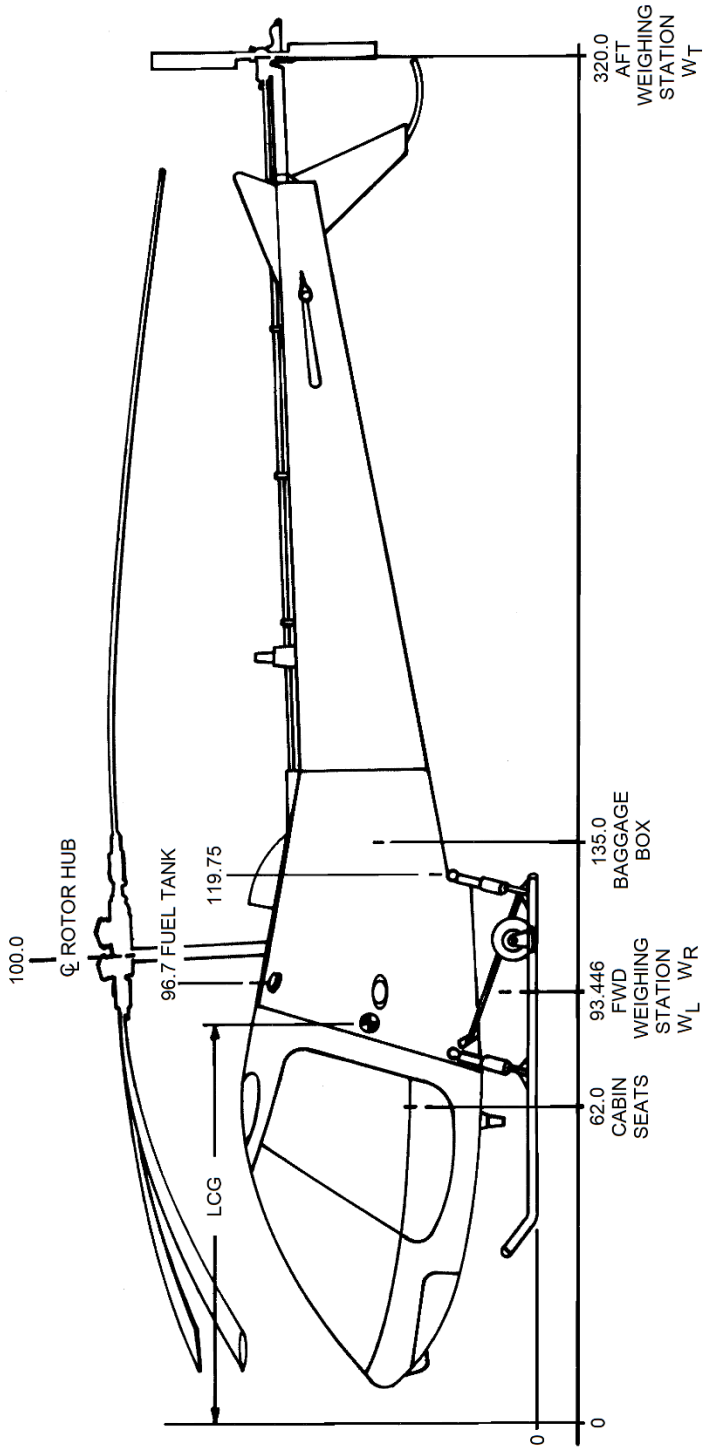


Figure 6.4

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

IV. LOADING INFORMATION

A. It is the responsibility of the helicopter pilot to insure that the helicopter is loaded properly. Using the running basic weight and moment from Form F-165A (Figure 6.8) and the Loading Chart (Figure 6.5), the pilot can obtain the total weight and moment for various loading conditions. The pilot should first calculate the total weight and moment for zero usable fuel, as this will show the c.g. shift with fuel burn-off. If the c.g. is within limits, add the planned fuel load and compute the c.g. If the c.g. is within limits, the last item to check is the lateral offset moment using the stations in Section II B and Figure 6.2.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

B. Sample Calculation – Longitudinal C.G.

SAMPLE LOADING	SAMPLE HELICOPTER Arm (in)	SAMPLE HELICOPTER Weight (lb)	SAMPLE HELICOPTER Moment (1000 in-lb)	HELICOPTER S/N_____ Weight (lb)	HELICOPTER S/N_____ Moment (1000 in-lb)
1. Basic empty weight from Form F-165A	100.7	1610.0	162.1		
2. Pilot and passengers Cabin seats	62.0	480.0	29.8 (1)		
3. Baggage compartment load	135.0	20.0	2.7 (1)		
4. Total weight and moment with zero usable fuel to check c.g. shift with fuel burn-off (landing condition)	92.2 (2)	2110.0	194.6		
5. Usable fuel	96.7	240.0	23.2 (1)		
6. Total weight and moment with usable fuel (takeoff condition)	92.6 (2)	2350.0 (3)	217.6		

(1) Moments obtained by multiplying weight times arm or from Loading Chart, Figure 6.5.

(2) The longitudinal c.g. relative to the datum line may be found by dividing the moment by the weight.

$$\text{c.g. zero fuel} = \frac{194{,}600 \text{ in-lb}}{2110.0 \text{ lb}} = 92.2 \text{ in}$$

$$\text{c.g. zero fuel} = \frac{217{,}600 \text{ in-lb}}{2350 \text{ lb}} = 92.6 \text{ in}$$

The total weight and moment can also be plotted on Figure 6.6 to determine if the loading is within longitudinal limits.

(3) Maximum gross weight is 2600 lb.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

C. Sample Calculations - Lateral Offset Moment

	Arm inches	Weight lbs	Moment in-lbs
Pilot (left seat)	- 13.5	170	- 2295
Passenger (center seat)	+ 3.0	140	+ 420
Passenger (right seat)	+ 20.5	170	+ 3485
			+ 1610

Plot 2350 lbs and +1610 in-lbs on Figure 6.2 to insure moment is in approved area.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

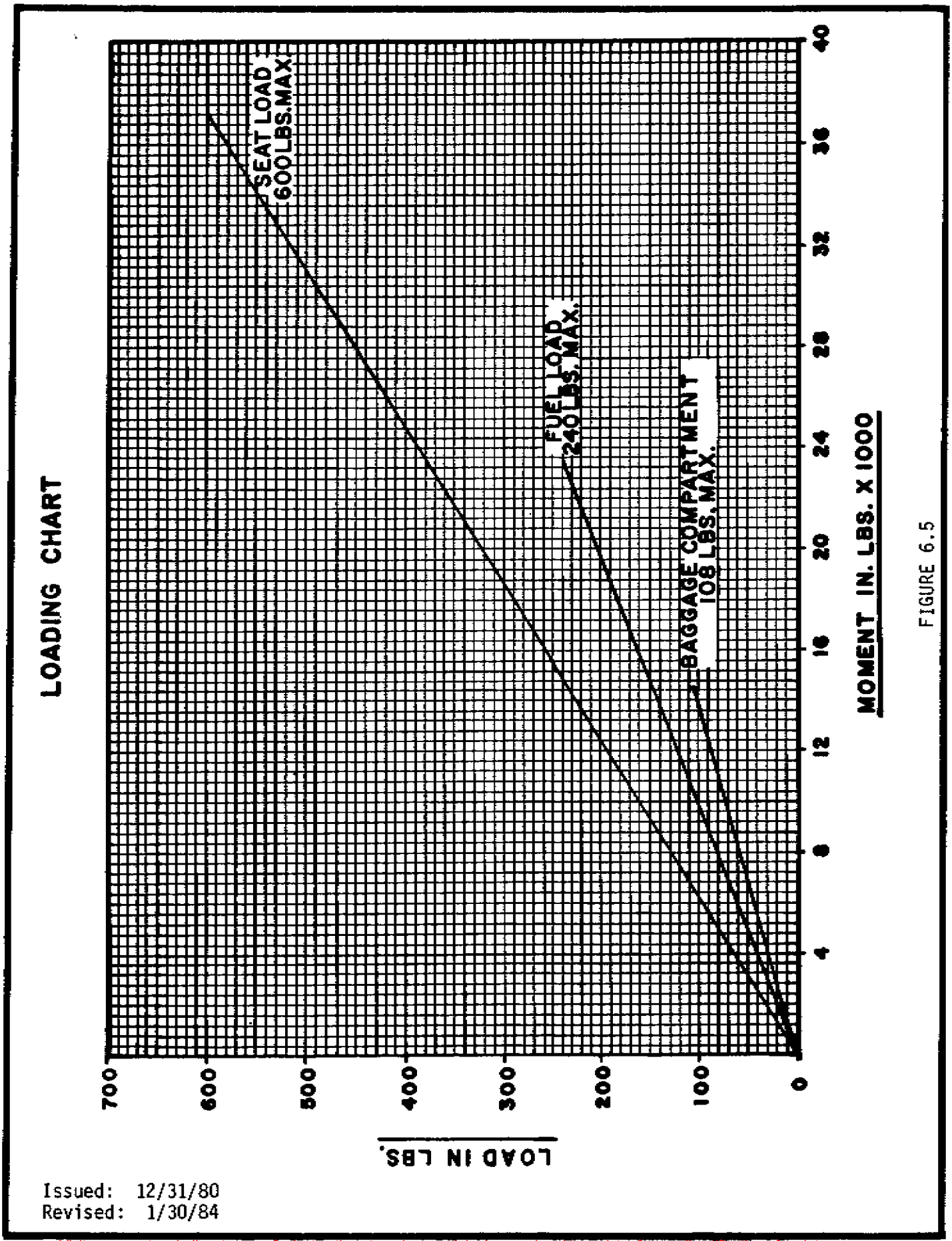


FIGURE 6.5

REVISIONS:

Issued: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

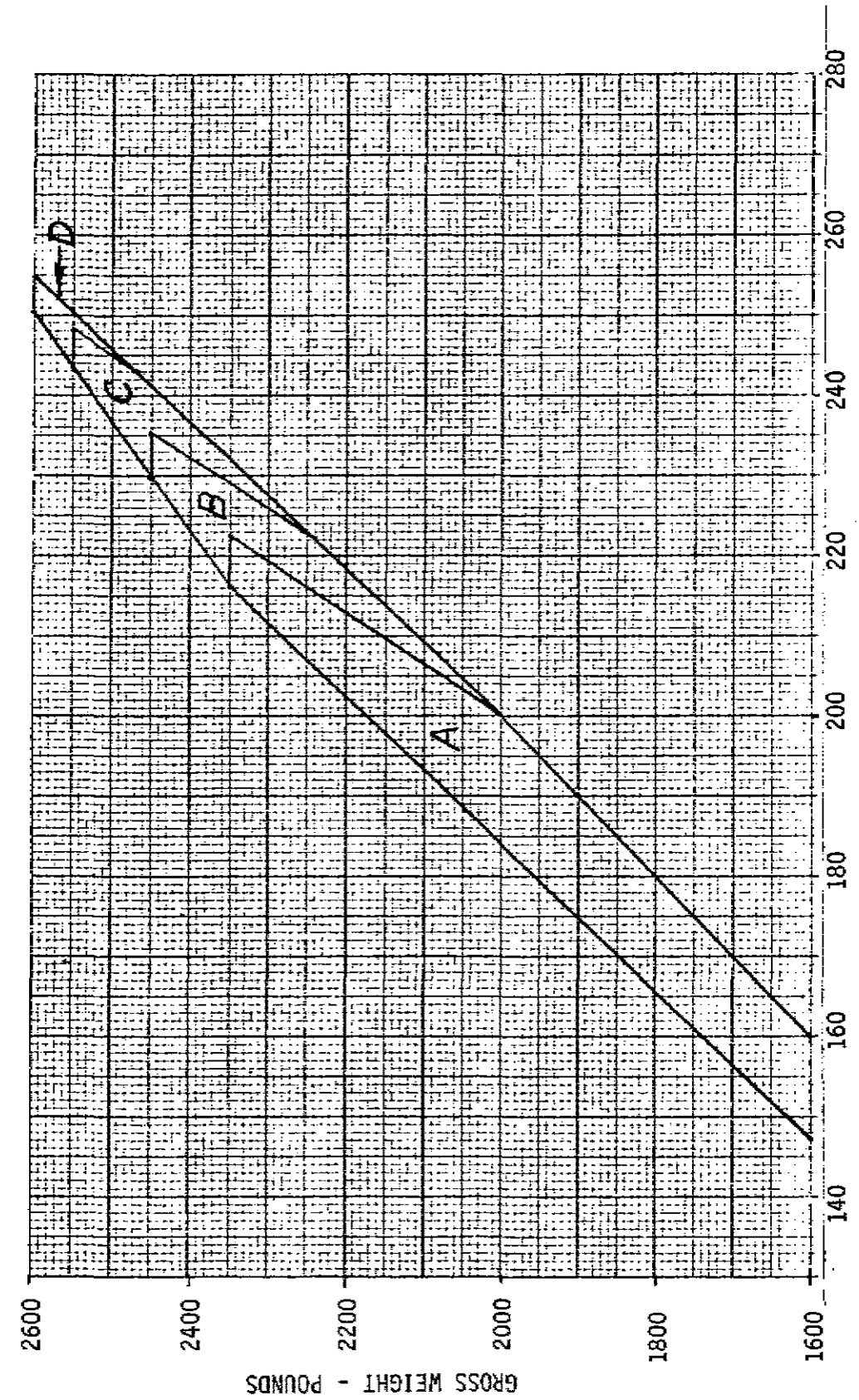


FIGURE 6.6 Gross Weight vs Longitudinal Moment

REVISIONS:

Issued: 7/1/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

WEIGHT SHEET

MODEL _____ SERIAL NO. _____ REG. NO. _____

WEIGH POINT	SCALE - LBS.	TARE	NET. WT.	ARM	MOMENT X 1000
LEFT GEAR			(W_L)		
RIGHT GEAR			(W_R)		
TAIL			(W_T)		
TOTAL					

$$LCG = \frac{WT(320.0) + (W_L + W_R)(93.446)}{W_T + W_L + W_R} = \_\_\_\_\_$$

DATE _____ WEIGHED BY _____

FIGURE 6.7

REVISIONS:

Issued: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

BASIC WEIGHT AND BALANCE RECORD

MODEL NO. _____ SERIAL NO. _____ REG. NO. _____

ACTUAL DELIVERED WEIGHT AND BALANCE DATA

ITEM NO.	DATE	ITEM IN	ITEM OUT	DESCRIPTION OF ARTICLE OR MODIFICATION	WEIGHT ADDED + WEIGHT	WEIGHT ADDED + ARM	WEIGHT ADDED + MOMENT 1000 IN-LB.	WEIGHT REMOVED - WEIGHT	WEIGHT REMOVED - ARM	WEIGHT REMOVED - MOMENT 1000 IN-LB.	RUNNING BASIC TOTAL WEIGHT	RUNNING BASIC TOTAL ARM	RUNNING BASIC TOTAL MOMENT 1000 IN-LB.

FIGURE 6.8

FORM F-166A

REVISIONS:

Issued: 12/31/80 Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

HELICOPTER WEIGHT AND C.G. CALCULATION

MODEL _____ SERIAL NO. _____ REG. NO. _____

		WEIGHT LBS.	ARM IN.	MOMENT 1000 IN-LB.
WEIGHT (AS WEIGHED)				
PLUS: MISSING STD. EQUIPMENT				
LESS: OPTIONAL & SURPLUS WT.				
LESS: ENGINE OIL				
PLUS: 12 LBS. UNUSABLE FUEL				
WEIGHT EMPTY STD. HELICOPTER	COMPUTED			
	ACTUAL			
PLUS: ENGINE OIL				
PLUS: OPTIONAL EQUIPMENT				
TOTAL BASIC WEIGHT				

FORM F-168A

FIGURE 6.9

REVISIONS:-

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

ENSTROM 280F EQUIPMENT LIST

SERIAL NO.

F.A.A. APPROVED REGISTRATION NO. DATE

NO.	ITEM	WT.	ARM
	INSTRUMENTS - REQUIRED		
	ALTIMETER	1.2	36
	AIRSPEED	.5	36
	TACHOMETER	1.3	36
	MANIFOLD - FUEL PRESSURE	1.5	36
	INSTRUMENT CLUSTER	2.0	36
	OIL TEMPERATURE		
	OIL PRESSURE		
	GEARBOX TEMPERATURE		
	CYLINDER TEMPERATURE		
	FUEL QUANTITY		
	AMMETER		
	COMPASS	1.0	40
	OAT GAUGE	0.5	55
	BALL BANK INDICATOR*		
	E.G.T. GAUGE	0.5	36

NO.	OPTIONAL EQUIPMENT	WT.	ARM	MOMENT

*STANDARD EQUIPMENT NOT REQUIRED BY F.A.A.

FIGURE 6.10

REVISIONS:—

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

ENSTROM 280F OPTIONAL EQUIPMENT LIST CONTINUED

SERIAL NO.

F.A.A. APPROVED REGISTRATION NO. DATE

NO.	ITEM	WT.	ARM	MOMENT

FIGURE 6.11

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 7

AIRCRAFT AND SYSTEMS DESCRIPTION

REVISIONS.

Issued: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 7 - AIRCRAFT AND SYSTEM DESCRIPTION

I. GENERAL

One of the first steps in obtaining the utmost performance and service from your 280F is to familiarize yourself with its equipment, systems, and controls.

II. INTERIOR ARRANGEMENT

The cabin interior is a full, three-place, side-by-side seating arrangement with a 58-inch width. The instrument panel is on the vertical plane for more natural scanning. Excellent visibility is offered through the tinted plexiglass windshield, cabin doors, twin overhead and lower deck windows. Swing-open doors close securely with simple-to-operate safety lock handles. The helicopter can be flown with either left, right, or both doors removed.

III. AIR INDUCTION SYSTEM

The air induction system consists of a filtered non-ram intake located within the engine compartment. It incorporates a spring-loaded, automatic alternate air source and spring-loaded backfire door.

IV. POWER PLANT

An Avco Lycoming HIO-360-F1AD 225 HP engine is used in this helicopter. The engine is a direct drive, four cylinder, fuel injected, horizontally opposed, air cooled engine. This engine incorporates features for turbocharging. Platinum spark plugs are supplied with the engine.

NOTE: It is recommended that the appropriate Lycoming Operator's Manual be consulted prior to any adjustment or repair to the engine.

A. Oil System

The Lycoming engine employs a wet sump lubrication system having a capacity of 8 quarts. The engine oil pump circulates the oil through two remote mounted oil coolers to provide cooling. One is located on the right-hand side of the engine compartment and the second cooler is located below the cooling fan. A thermostatic bypass and pressure relief valve are supplied as standard equipment. Restricted pressure engine oil is also circulated through the turbocharger bearing housing. A separate engine scavenge pump returns the oil to the engine sump. A bayonet-type oil quantity gauge with graduated markings is part of the oil filler cap and is accessible through the left fuel drain access door.

The total oil system has a capacity of 10 quarts. This includes the oil in the engine, oil filter, oil coolers and oil lines.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

Standard type gauges are provided for both the engine oil temperature and oil pressure indications. Both gauges are marked to provide visual engine operating limitations and are located on the instrument panel.

B. Engine Controls

1. Throttle. A twist grip-type throttle is located on the collective pitch control stick. The throttle is connected to a mechanical throttle correlation device which coordinates throttle control for changes in collective pitch settings. The throttle correlation linkage is connected to the fuel servo throttle valve on the engine. A protruding head rivet mounted on the forward end of the twist grip is used for a start position index.

2. Mixture Control. A vernier mixture control knob is provided on the instrument console. This vernier control incorporates the features of a standard push-pull cable. Full rich is in the "in" position. Full lean is in the "out" position. The vernier feature allows a screw type of adjustment to fine tune any preset mixture position.

3. Magneto Switch. The magneto switch is a key-operated switch located on the left side of the switch circuit breaker panel. For starting, place the switch in the "both" position.

4. Ignition Circuit Breaker. This circuit breaker closes the circuit to the starter button on the collective control.

5. Starter Button. The starter button is located on the end of the collective control. Push to engage.

6. Master Switch. The master switch is located on the left side of the switch circuit breaker panel. It is a single-throw, two-position switch.

C. Turbocharger

The turbo unit has only one moving part, a rotating shaft with a turbine wheel on one end and a compressor impeller on the other, all precision balanced and each contained in its own housing. The turbine wheel, driven by exhaust gas energy, drives the impeller which compresses intake air to a density greater than sea level and delivers it to the engine intake. This increased volume of air allows the engine to "breathe" with the same volumetric efficiency that it does at low altitudes. The engine can produce 225 HP at all altitudes up to 12,000 feet density altitude.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

D. Wastegate

The wastegate is a valve that controls the amount of exhaust gases directed to the turbocharger. The valve is located on the exhaust manifold just upstream of the turbine inlet. The valve is controlled by mechanical linkage connected to the fuel servo throttle valve.

V. EXHAUST GAS TEMPERATURE SYSTEM

The exhaust gas temperature, as shown on the panel-mounted indicator, is used as an aid for fuel mixture leaning in cruising flight. The panel indicator is red-lined at 1650°F. The exhaust temperature probe is located on the exhaust stack just before the inlet to the turbocharger. This allows an actual temperature measurement of the exhaust gases that are delivered into the turbocharger unit.

VI. CABIN HEAT

The cabin heat control is located at the left-hand side of the pilot's seat, on the floor. By moving the control in or out, the operator regulates the amount of cabin heat through the output louvers located in the center of the floor under the instrument panel.

VII. CLUTCH ENGAGING LEVER

The clutch engagement lever is located at the right side of the pilot's seat on the forward face of the seat structure. The clutch lever is provided as a means of engaging and disengaging the rotor drive system. A red warning light illuminates when the master switch is on and the clutch is disengaged.

The rotor drive system is engaged by pulling the clutch lever upward and rearward until the lever hits the stop and the warning light goes out. The handle can then be stowed by lifting it straight up and pivoting it down to the floor. When it is in the stowed position, the handle should lie flat on the floor. If it does not lie flat on the floor in the stowed position, the clutch rigging should be checked as described in Section 11 of the Maintenance Manual. The clutch lever must be stowed whenever the rotor drive system is engaged.

VIII. FUEL SYSTEM

The system consists of two interconnected 21 US gallon fuel tanks, which feed simultaneously to the engine. The tanks are located on the left and right side of the aircraft over the engine compartment. The tanks have a total fuel capacity of 42 US gallons, with a total of 2 gallons unusable fuel, one gallon unusable fuel in each tank. Each fuel tank is gravity fed to a central distributing line which connects to the electric boost pump and engine-driven pump. The fuel control valve is an off-on type and

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

is located on the firewall next to the pilot's left shoulder. Each tank has an individual drain valve in the bottom. There is also a main gascolator filter located aft of the firewall in the engine compartment. The control is on the right-hand side of the engine compartment and extends beyond the side panel.

A. Auxiliary Fuel Pump Switch. The fuel boost pump switch and fuel pressure warning lights are located on the switch circuit breaker panel. The green warning light will stay illuminated as long as the fuel boost pump is operational. The red light will illuminate at any time the fuel boost pump is shut off or fails to function properly.

B. Fuel Quantity Indicator. The fuel quantity gauge continuously indicates the total quantity of fuel. It is hooked up through a simple liquidometer float located in the right-hand fuel tank. A translucent strip on each tank provides a direct, visual indication of fuel level.

C. Fuel Flow - Fuel Pressure Indicator. The fuel pressure indicator provides pounds per hour and pressure readings of the fuel as delivered to the flow divider. The indicator is marked for normal operating range from 0 to 160 pounds per hour and 0 to 25 psi index lines in 5 psi increments.

IX. TRANSMISSION SYSTEM

The main transmission unit provides an rpm reduction between the engine and the main rotor. The transmission incorporates a free-wheeling unit in the upper pulley assembly which is mounted on the pinion input shaft. The free-wheeling unit provides a disconnect from the engine in the event of a power failure and permits the main and tail rotors to rotate in order to accomplish safe autorotation landings. The main rotor transmission has a sight gauge which is located on the aft right-hand side and is visible through an opening in the baggage compartment or the right access panel.

A main rotor transmission gauge is located on the instrument panel and is red-lined at 225°F.

The tail rotor transmission, mounted at the aft end of the tail cone, supports and rives the tail rotor. The tail rotor transmission is equipped with a self-contained lubricant supply, a visual lubricant level gauge at the rear of the housing, and a magnetic plug which can be removed to inspect for metal particles.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

X. ROTOR SYSTEM

A. Main Rotor

The main rotor is a three-blade, fully articulated system. The fully articulated system in the 280F helicopter is designed to provide smooth control responses in all modes of flight. Sufficient kinetic energy stored in the heavy rotor blades allows safe autorotation landings in the event of power failure. The rotor assembly consists of three all-metal bonded blades, upper and lower rotor hub plates, universal blocks, blade grip assemblies, and hydraulic lead-lag dampers.

Polyurethane tape, as supplied by the Enstrom Customer Service Department, can be installed on the leading edge of the main rotor blades as described in Service Information Letters 0024 and 0069. If the tape is intalled, it must be inspected prior to each flight. Look for blisters, bubbles, holes, or separation from the blade. If any defects are found, it must be removed or replaced before further flight. If the helicopter is operated in rain, the tape life may be shortened considerably. Separation of part or all of the blade tape can cause an extremely rough rotor system. In this event, the helicopter should be landed as soon as practical and the rotor system, blades and tape inspected prior to further flight.

B. Tail Rotor

The tail anti-torque rotor counteracts the torque of the main rotor and functions to maintain or change the helicopter heading. The tail rotor is a two-bladed, teetering, delta-hinge type assembly.

C. Rotor Tachometer

The rotor rpm indicator is part of a dual-purpose tachometer which also reads engine rpm.

XI. FLIGHT CONTROLS

A. Cyclic Control

The cyclic control stick is a curved tube extending from the floor up between the legs of the pilot. The direction of stick movement results in a change of the plane of rotation of the main rotor and will produce a corresponding directional movement of the helicopter through the longitudinal and lateral modes of flight. The stick grip incorporates a trigger-type switch used for radio transmissions and intercom. A trim switch is also located on the cyclic stick grip to control the longitudinal and lateral stick forces.

REVISIONS:
Issued: 12/31/80
Revised: 12/14/88

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

B. Stabilizer

An all-metal, fixed position stabilizer is installed on the tail cone assembly for longitudinal stability.

C. Collective Pitch Control

The collective pitch control lever is located to the left of the pilot's position and controls the vertical mode of flight. A rotating, grip-type throttle is located at the end of the collective control.

D. Directional Control Pedals.

The directional control pedals are located in the cabin forward of the pilot and/or co-pilot. When moved, these adjustable pedals change the pitch of the tail rotor blades and thereby provide the method of changing directional heading.

XII. FLIGHT INSTRUMENTS

The standard flight instruments which are installed in the 280F as basic equipment comply with the requirements under visual flight rules for day or night operation. The panel arrangement provides ease of visual observance and includes space provisions for installation of additional instruments to meet individual requirements.

A. Airspeed Indicator

The single-scale airspeed indicator is calibrated in mph and provides an indicated airspeed reading during forward flight. The pitot tube, which provides air pressure source, is located below the cabin nose section. Static air pressure for instrument operation is derived from two static vents located on either side of the tail cone assembly. The openings in the pitot tube and static vent ports must be maintained obstruction-free and clean at all times for proper instrument operation.

B. Altimeter

The altimeter is a sensitive type that provides distance-height readings from 0 to 25,000 feet. The long hand in a single complete sweep of the dial totals 1,000 feet, and the short hand totals thousands of feet altitude. The instrument is vented to the same static port vents as the airspeed indicator.

C. Compass

A standard aircraft quality magnetic compass is mounted on the center windshield support within easy sight of pilot or co-pilot. It is to be used in conjunction with a compass correction card located adjacent to the instrument.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

D. Free Air Temperature Indicator

The free air temperature indicator is a direct reading, bi-metallic instrument with a stainless steel probe. This instrument provides ambient temperature information which, when utilized, will assist in determining performance capabilities of the helicopter at the existing climatic condition. The indicator is located in the top of the cabin.

XIII. ELECTRICAL POWER SUPPLY SYSTEM

A. Direct Current Power System

The basic power supply system is either a 12-volt or 28-volt direct current system, with a negative ground to the helicopter structure. A belt-drive 70-amp alternator is located on the aft part of the engine. If the helicopter has a 12-volt battery, the 12-volt battery is located in the right-hand side of the pilot's compartment and serves as a stand-by power source to supply power to the system when the alternator is inoperative. If the helicopter has a 28-volt system, a 24-battery is located above the right side of the aft landing gear cross tube.

B. Electrical Power Panel

The following switches/combination circuit breakers are located on the switch circuit breaker panel mounted on the instrument console within easy reach of pilot or co-pilot: magneto key switch, master switch, alternator switch and alternator circuit breaker, boost pump switch, navigation position lights switch, anti-collision light switch, and trim motor switch.

XIV. LIGHTING EQUIPMENT

The helicopter lighting kit includes the required lights necessary for VFR night operation plus additional lighting equipment for utility and convenience purposes. The electrical panel on the right-hand side of the instrument console contains the protective circuit breakers and control panels for the lighting equipment.

A. Position Lights

Two position lights are located one on either side of the horizontal stabilizers and one light is located on the end of the tail cone.

B. Anti-Collision Lights

The anti-collision lights have a flashing action that provides for adequate identification of the helicopter. The lights are located at the tip of the horizontal stabilizers. They are operated by the anti-collision switch located on the panel.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

C. Landing Lights

The landing lights are of the fixed type; one is mounted on the nose and the other on the underside of the aircraft and set to the desired angle to provide the best forward and down illumination. The switches for operation of the landing lights are located on the instrument panel in the electrical console section. The light on the underside of the aircraft is primarily designed to provide illumination while hovering.

XV. GROUND HANDLING WHEELS

Each landing gear skid tube has a manually operated overcentering device to lower the wheels or retract them for flight. The ground handling wheels should be retracted and the helicopter allowed to rest on the skids when engine run-up is being performed or when the helicopter is parked.

XVI. BAGGAGE COMPARTMENT

A compartment for storage of baggage is provided in the area aft of the engine compartment. Access is through a single door located on the right-hand side which has a lock for external locking. The capacity of the compartment is approximately 6.3 cubic feet and it has an allowable loading capacity of 108 lbs at Station 135.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 8

INSPECTIONS, MAINTENANCE, SERVICING, STORAGE AND HANDLING

REVISIONS:

Issued: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 8 - INSPECTIONS, MAINTENANCE, SERVICING, STORAGE AND HANDLING

I. GENERAL

Federal Aviation Regulations place the primary responsibility of maintaining the helicopter in an airworthy condition on the owner or operator of the helicopter. The owner of the helicopter should register the helicopter with Enstrom Helicopter Service so he will receive the latest Service Directive Bulletins, Service Information Letters, and manual revisions. All procedures, limits, service and maintenance requirements contained in this manual and the Maintenance Manual are considered mandatory.

Registration of the helicopter in accordance with FAR Part 47 will insure receipt of FAA Airworthiness Directives (AD's). AD's are mandatory inspections or changes that must be completed within the time specified in the Directive.

II. REQUIRED INSPECTIONS

A. Annual Inspection

All civil helicopters of US Registry are required to receive an annual inspection in accordance with FAR Part 43.

B. 100-Hour Inspection

All civil helicopters of US Registry operated for hire are required to receive a 100-hour inspection.

C. Rotorcraft Maintenance Manual

See the Inspection Section of the Maintenance Manual for information on:

1. 50-hour inspection
2. 25-hour inspection
3. Lubrication intervals
4. Special inspections

III. MAINTENANCE

All maintenance, preventive maintenance and alterations to the helicopter must be performed in accordance with the Maintenance Manual procedures by appropriately rated personnel. All maintenance performed requires a Log Book entry in the helicopter log or the engine log. These documents need not be carried in the helicopter but must be available to mechanics performing maintenance and inspections.

REVISIONS:

Issued: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

IV. PREVENTIVE MAINTENANCE BY THE PILOT

Federal Aviation Regulations, Part 43, Appendix A, defines work classified as preventive maintenance. Preventive maintenance may be performed by a certified pilot on a helicopter he or she owns or operates. The work must be performed in accordance with the Maintenance Manual and logged in the helicopter or engine log. Examples of preventive maintenance are:

A. Lubrication not requiring disassembly other than removal of non-structural items such as cover plates, cowlings and fairings.

B. Applying preservative or protective material to components where no disassembly of primary structure or system is included.

C. Replacing bulbs, reflectors and lenses of position lights and landing lights.

D. Replacing or cleaning spark plugs and setting of spark plug gap clearance.

E. Replacing defective safety wiring or cotter keys.

V. SERVICING

Servicing of the helicopter includes changing or replenishment of fuel, oil, lubrication and other maintenance functions.

A. Fueling Locations

There are two fuel tanks located just aft of the cabin section and over the top of the engine. Each tank's capacity is 21 US gallons and is designed with a continuous cross feed so that fuel level remains the same in each tank. The tanks may be serviced from the fillers by either pressure or gravity methods. Observe the following precautions during servicing:

WARNING: Turn off all electrical switches.

Disconnect external power, if used.

Ground aircraft by attaching grounding cable to landing gear skids.

1. Fuel Capacity

a.	Total quantity:	42 US gallons
b.	Usable quantity:	40 US gallons
c.	Grade:	100/130, 100LL

REVISIONS:

Issued: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

2. Servicing Fuel System

The fuel filler caps are located on the top outboard of each fuel tank.

3. Filling Fuel System

To prevent moisture condensation, refuel aircraft as soon as possible using the following procedure:

WARNING: Use all necessary precautions to eliminate any fire hazard.

CAUTION: In many cases it may be necessary to operate from fields lacking normal, fuel servicing. When fueling from drums or any questionable source of supply, a clean funnel and a chamois cloth should be used to remove any foreign materials.

a. Attach ground wire to landing gear skids.

b. Remove fuel cap and insert hose nozzle.

CAUTION: Do not allow nozzle to bend filler neck. This will help prevent bending the fiberglass fuel tanks.

c. Maintain visual check during fueling by use of the sight strip on the face of the fuel tanks.

NOTE: When refueling a hot engine, service the right tank, opposite the turbocharger exhaust first, allowing turbo exhaust to cool down prior to refueling the left tank.

NOTE: As cross-feeding is occurring during fueling, and to insure full capacity of both tanks, it may be necessary to refill the right side tank, taking care not to overfill.

d. Secure fuel caps and remove ground wire.

e. Visually check all fuel lines and components for signs of leaks.

4. Draining Fuel System

Fuel draining should be accomplished with the helicopter in a nose-down attitude. There are two methods of removing the fuel:

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

a. Defuel through the filler neck, using a pump or siphon. Final draining must be accomplished using the fuel system drain valves.

b. Defuel using the fuel system drain valves. Be sure that drain valves are "closed" and secure after completing defueling of the aircraft.

B. Engine Oil System Locations

The engine has a wet sump lubrication system located on the bottom of the engine. Oil quantity is checked by the use of a dipstick located inside the left panel door just below the fuel tank. Oil is added to the engine through the adjacent tube, using an automotive-type filler spout. Lycoming recommends oil and filter changes at every 50 hours of operation, and more frequently if operated in dusty, dry climates.

1. Adding - Engine Oil System

a. Visually check oil level on dipstick. Add oil to bring level to the 10 quart graduation mark.

b. Secure filler cap.

2. Draining - Engine Oil System

a. Place suitable container under belly panel.

b. Remove drain valve plug, allow oil to drain.

NOTE: Engine oil should be warm, and a sufficient amount of time should be allowed for complete drainage of sump.

3. Replacement of Engine Oil Filter (P/N CH 48103)

A spin-on type oil filter is located on the accessory housing. The filter should be replaced at each oil change. To replace the filter, follow the procedures below.

a. Remove seat back and seat deck panel.

b. Remove firewall panel located behind pilot side.

c. Remove and discard safety wire.

d. Using a 1-inch socket, remove filter.

e. Replace with new filter, lubricating seal with oil.

REVISIONS:

Issued: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

f. Torque to 18-20 ft/lbs and safety with .032 safety wire.

g. Cut open filter and inspect for excessive metal.

4. Draining - Engine Oil Cooler

See Maintenance Manual

5. Servicing Engine Oil System

Use of an ashless dispersant oil at all times is recommended by Lycoming. (Refer to Lycoming Service Instruction No. 1014J for selected grades for your climate.)

a. Secure oil cooler drain connections.

b. Add another 8 quarts of oil to the engine sump.

NOTE: The installation of the oil filter and oil cooler will require the addition of 2 additional quarts of oil after the initial ground run.

c. Secure filler cap and dipstick.

d. Check all oil lines and components for evidence of leaks.

C. Battery Information

The battery stores electrical energy produced by the aircraft alternator and supplies current to the electrical system on demand. The aircraft uses either a 12-volt or a 24-volt battery. The 12-volt battery, if equipped, is located under the seat deck panel on the extreme right side of the seat deck. The 24-volt battery, if equipped, is located immediately aft of the aft cross tube on the right hand side of the aircraft. The battery is set in a box and secured by a hold-down bracket.

1. Electrolyte Spillage

Overfilling and overcharging are two common causes of electrolyte spillage. To preclude corrosion due to battery acid spillage, these simple servicing precautions should be performed.

NOTE: An overvoltage regulator is installed in the system to "kick out" the voltage regulator in case of overcharging conditions.

a. Maintain the proper electrolyte level.

b. Visually inspect battery for cracks, spillage, corrosion, and security of mounting.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

c. Visually inspect adjacent structures for evidence of corrosion or spilled electrolyte.

CAUTION: In the event that the battery is low and an auxiliary power unit is not installed on the aircraft, use care when connecting automotive jumper cables. Burn damage to the battery cables will require replacement.

2. Battery - Servicing

a. Unscrew filler caps on top of battery.

b. Visually inspect electrolyte level in all cells. (Proper level is 3/16 inch above battery plates.)

c. Add water if required and recheck level.

d. Install filler caps.

e. Clean spilled water off battery, using a clean cloth

CAUTION: To clean spilled electrolyte off battery, mix one part baking soda to three parts water. DO NOT allow solution to enter battery cells. Rinse with clear water and wipe off with clean cloth.

D. Main Transmission Location

The main transmission is located off the cabin section, mounted on the pylon above the engine. Power is transmitted to the main and tail rotor assemblies. Oil level is checked by a sight gauge located on the right aft side of the transmission. The small panel inside the baggage compartment can be opened for the inspection. With the helicopter in a relatively level position, the oil level should be at or near the halfway level in the sight gauge.

Main transmission oil	- 6 pints after overhaul
Capacity	- 5½ pints replenishing
Lubricant	- Mobil HD 80/90 Gear Lubricant

1. Draining - Main Transmission

A magnetic drain plug is located on the bottom of the transmission on the left aft corner. On low time transmissions it is normal to have metallic fuzz on the magnetic plug.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

The following procedures are to be used in draining the transmission:

a. Remove safety wire from plug.

b. Install a trough-type device under the plug, outward to the left side of the aircraft.

c. Place a suitable container under the trough to catch the oil.

d. Remove the magnetic plug, allowing oil to drain.

NOTE: Allow ample time for complete drainage.

e. Inspect magnetic plug for evidence of metal.

f. Discard and replace magnetic plug crush washer.

2. Servicing - Main Transmission

The transmission filler is located on the top of the transmission. It has a spring loaded cap and an "O" ring for proper sealing. A screen inside of the filler filters any foreign material during replenishment.

a. Reinstall magnetic plug and safety, using .032 safety wire.

NOTE: It is permissible to safety the plug to the pylon tube after wrapping tube with a suitable protection tape.

b. Service transmission with 5½ pints of authorized lubricant.

c. Visually inspect transmission for any evidence of leaks.

E. Over-Running Clutch Location

The over-running clutch is located on the main transmission pinion shaft, inside the upper drive belt pulley. The clutch is a free-wheeling unit designed to allow the main rotor to maintain rpm in the event of engine failure, allowing the helicopter to autorotate to a landing.

NOTE: For removal or replacement of the clutch, refer to the Enstrom Maintenance Manual.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

1. Servicing – Over-Running Clutch

   The clutch area should be looked at frequently to determine if any leaks exist. When a service check is required, proceed as follows:

   a. Turn clutch until two screws are horizontal and the third screw is above.

   b. Remove the top screw and one of the side screws. If clutch is properly serviced, oil will seep from the side hole.

   c. Add oil through top hole. Due to the location of the drilled oil passage, it is possible for the sprags to partially block the hole, so that the clutch will take oil very slowly. Adding oil under pressure, using a spring-type oiler, can speed servicing. Add oil until a positive stream of oil comes from side hole.

   d. Rotate side hole slightly above horizontal and refill again. Refer to Enstrom Service Information Letter 0079A.

      Formsprag Clutch Oil/Synthetic Lubrication Specifications:

      -40°F to +120°F – MIL-PRF-7808

      -40°F to +120°F – MIL-PRF-23699

F. Tail Rotor Transmission

The tail rotor transmission is located on the aft end of the tail cone extension tube. It transfers power from the tail rotor drive shaft to the tail rotor assembly. On the aft side of the transmission is a sight gauge for visually checking for proper oil level. The gauge should indicate filled to at least half of the sight gauge with the aircraft in a relatively level position. (If bubbles are present in the sight glass, raise and lower the tail to change the attitude of the helicopter to clear any bubbles from the sight glass.) If the sight gauge indicates less than half, the transmission must be serviced before flight.

The tail rotor transmission oil capacity is 5 fluid ounces (US)/0.15 L. Approved oils for servicing the tail rotor transmission are as follows:

Exxon Mobile Corporation	Mobil 1 Synthetic Gear Lubricant LS 75W-90 Mobil Delvac 1 Synthetic Gear Oil 75W-90 Mobilube HD LS 80W-90 Mobilube HD Plus 80W-90
Shell Oil Company	Shell Helix Racing Gear Oil 75W-90
Exxon	Exxon Gear Oil GX 80W-90 Exxon Synthetic Gear Oil (SGO) 75W-90
Esso	Esso Gear Oil GX 75W-90 Esso Gear Oil GX Extra 75W-90
BP Lubricants USA, Inc.	Castrol Syntrax Limited Slip 75W-90 (Syntec Gear Oil)

1. Draining – Tail Rotor Transmission

   There is a drain plug located on the bottom of the transmission and a filler plug located just above the sight gauge.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

a. Remove safety wire and filler plug.

b. Using a suitable container, remove drain plug, allowing oil to drain completely.

c. Inspect magnetic plug for metal particles.

d. Remove and replace crush washer on magnetic plug.

e. Inspect condition of O-ring of filler plug. Replace if necessary.

2. Servicing – Tail Rotor Transmission

a. Install magnetic drain plug.

b. Using a suitable clean squirt can, add oil through the filler port until oil begins to flow from the filler port.

c. Install filler plug (torque 20 in-lb/2.3 Nm).

d. Safety wire the filler plug, magnetic plug, and sight gauge with 0.032” safety wire.

e. Visually check for oil leaks.

f. Wipe dry any oil spillage using a clean cloth.

G. Main Rotor Dampers – P/N 28-14375

Three dampers are located in the rotor system to control the lead-lag action of the main rotor blades.

NOTE: For removal and servicing, refer to Enstrom Maintenance Manual.

Approved hydraulic fluid: SF96-20.

H. Landing Gear Assembly

Oleo Struts - Four nitrogen-oil type dampers are used on the landing gear assembly to absorb landing shocks and to provide the damping required to eliminate ground resonance. The oleo is a steel tube construction with the piston assembly having a hard chrome finish. The relief valves in the piston are preset and are not to be field adjusted.

The oleos are to be inspected at each preflight and must be in working order and properly inflated before engaging rotor. Inspect as follows:

1. Check for proper inflation by observing piston position in strut. From ¾ inch to 1¾ inches of the chrome piston should be visible. When protective boots have been installed, measure from upper flange of piston assembly to the brass collar on seal housing. Satisfactory length is 3½ to 4½ inches.

2. Check oleo for leaking oil. If leakage is noted, refer to Maintenance Manual for removal and seal replacement instructions.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

2. The wheels should be in the “up” (retracted) position whenever the helicopter is to be run or when it is parked. The ground handling wheels are not required for flight and the assembly may easily be removed by removing the snap ring and washer from the outboard end of the shaft. Removal or installation of the wheels will change the helicopter weight and c.g. and shall be recorded on the Weight and Balance form (Figure 6.8).

3. Servicing

   a. Check the tire pressure, 70 to 75 psi.

   b. Lubricate axle shaft with general purpose grease.

   c. Lubricate wheel bearings with wheel bearing grease.

J. Transparent Plastic

The plastic cabin windows and doors provide complete visibility for the pilot and the passenger. Maintaining these plastic enclosures consists of proper cleaning procedures and good visual inspections. Clean with fresh water and a mild detergent soap.

NOTE: When cleaning windows with soap and water, always use a soft fiber tissue to avoid scratching or crazing. Rinse with clear water. Plastic cleaner may be used if desired.

K. Autorotation RPM Check

1. General

In order to autorotate throughout the complete range of gross weights and altitudes, the autorotation rpm must be set according to the schedule shown in Figure 8.1 or Figure 8.2. This setting was made before the helicopter left the factory and should not need to be changed if the helicopter is operated out of a base near sea level with the original blades.

If the blades are overhauled, or different blades are installed, the autorotation rpm should be checked. Blade tracking should have a very minor effect on autorotation rpm, but eventually these minor effects could add up to a significant change, so it is recommended to check the autorotation rpm after the aircraft has been tracked several times. If required, the autorotation rpm is adjusted to comply with the autorotation rpm schedule. The adjustment procedure is described in Section 12 of the maintenance manual.

NOTE: Autorotation RPM adjustments may only be performed by an appropriately rated mechanic.

2. Autorotation RPM Check

   a. The autorotation rpm should be checked to comply with the schedules shown in Figures 8.1 and 8.2. Figure 8.1 should be used if the helicopter is based at a location below 6000 ft. Figure 8.2 should be used if the helicopter is based at a location above 6000 ft.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

1) Determine the weight of the helicopter as it will be flown during the rpm check (reference Section 6). It is important to accurately know the gross weight of the helicopter including fuel and occupants during this test when the rpm is recorded in step 6).

2) Set the altimeter to 29.92 in Hg (1013 mbar) (pressure altitude).

3) Climb to an altitude that allows a safe recovery from autorotation. Record altitude and temperature.

WARNING: Autorotation should be entered at a high enough altitude to allow the pilot to stabilize the autorotation, record the data, and recover at a safe altitude and conducted over a suitable landing area in case of engine failure.

4) Climb an additional 500 ft (or to an altitude sufficient to permit a stabilized autorotation while descending through the previous recorded altitude).

5) Establish the helicopter in a stabilized autorotation at 60 MPH with the collective full down. Do not allow the rotor RPM to exceed 385 rpm or to fall below 334 rpm.

6) Record rotor rpm passing through the altitude from step 3).

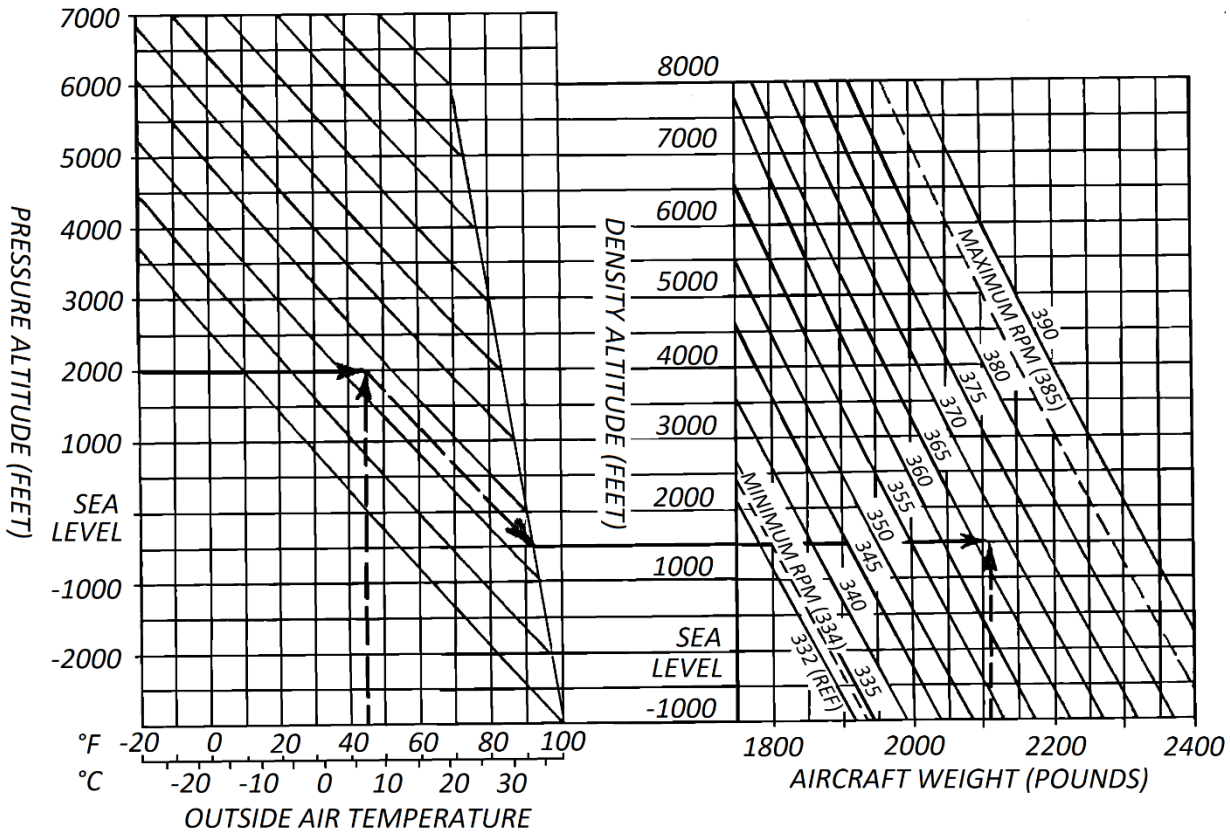
7) Compare the rotor rpm, outside air temperature (OAT), and pressure altitude readings with the information provided in Figure 8.1 or Figure 8.2, as appropriate. The actual rpm should be within ± 5 rpm of the chart.

8) If the rpm is not correct as indicated by the appropriate schedule, maintenance action is required to adjust the autorotation RPM.

9) If the rpm is adjusted, re-check the rpm as described in steps 1) through 7) of this procedure.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED



Example:

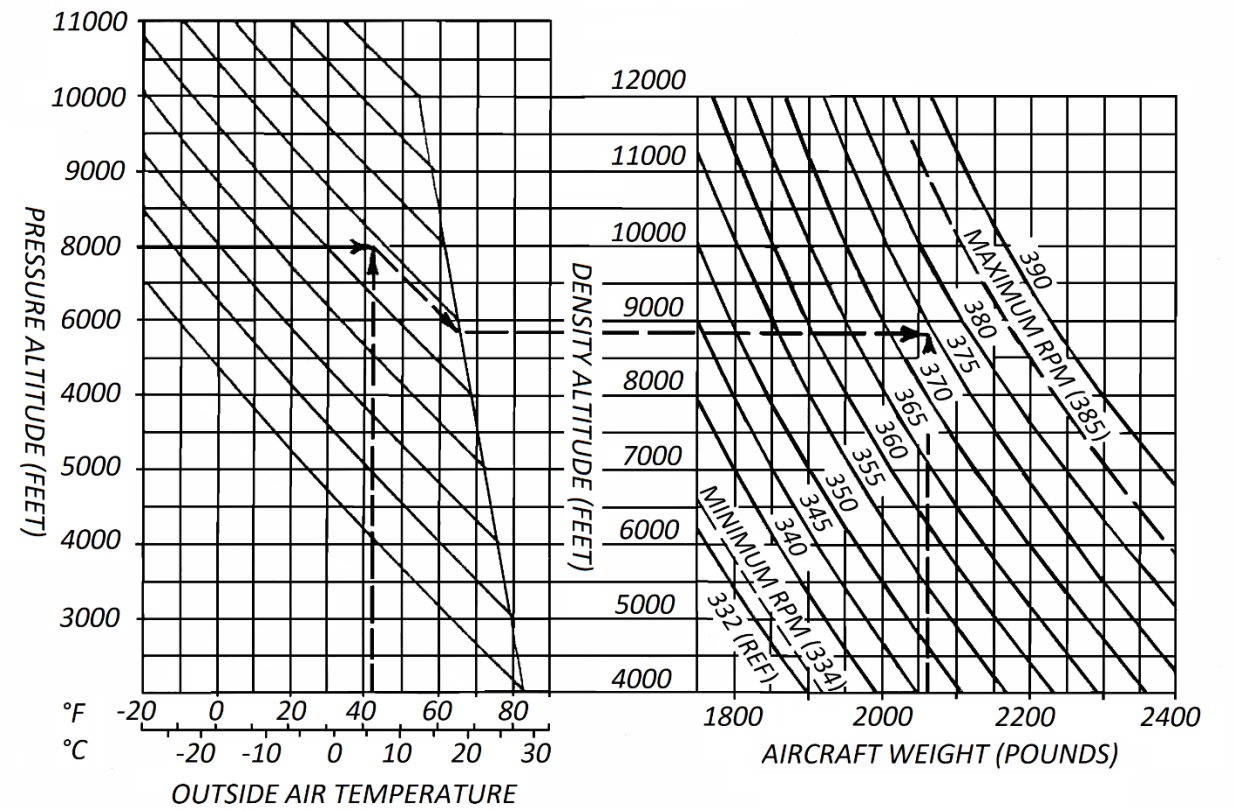
RPM checked passing through 2000 ft pressure altitude
OAT at this altitude: 45°F (7°C)
Density altitude is 1500 ft
Aircraft weight when RPM was checked: 2110 lb
Autorotation RPM should be 367 with collective full down

Check RPM in steady 60 MPH autorotation with the collective full down. Record pressure altitude (altimeter set to 29.92), OAT, rotor RPM, and aircraft weight. Do not exceed 385 RPM or drop below 334 RPM.

Figure 8.1 – Autorotation RPM Schedule for Sea Level Base Altitude

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED



Example:

RPM checked passing through 8000 ft pressure altitude
OAT at this altitude: 42°F (6°C)
Density altitude is 8800 ft
Aircraft weight when RPM was checked: 2060 lb
Autorotation RPM should be 374 with collective full down

Check RPM in steady 60 MPH autorotation with the collective full down. Record pressure altitude (altimeter set to 29.92), OAT, rotor RPM, and aircraft weight. Do not exceed 385 RPM or drop below 334 RPM.

Figure 8.2 – Autorotation RPM Schedule for 6000 Foot Level Base Altitude

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

L. Blade Tape

Leading edge tape, as supplied by Enstrom Customer Service, can be installed on the leading edges of the main rotor blades. This tape will provide some corrosion protection for the main rotor blades. If this tape is installed, it must be inspected before each flight for holes, blisters, bubbles, or separation of the tape from the blade. If any defects are found, the tape must be removed, repaired, or replaced before further flight. The tape should be kept clean, just as any blade must be kept clean for maximum efficiency. Clean the tape only with soap and water. Do not use solvent on or around the blade tape.

M. Cabin Doors

Operation with doors removed is approved. All loose objects and equipment within the cabin must be properly secured.

NOTE: Removal or installation of the doors will change the helicopter weight and c.g. and shall be recorded on the Weight and Balance form (Figure 6.8).

1. Remove the retaining clips on either end of the gas strut and remove the gas strut.
2. Remove the strap.
3. Remove the upper hinge bolt. Support the door while removing the bolt. Note the number of washers and their position prior to removing bolt.
4. Slightly raise the door off the bottom hinge pin and remove the door. Note the number of washers, if any, at the bottom of the hinge pin.

The door installation is the reversal of the steps above. Check door and door latch for proper operation.

N. Copilot Flight Controls

To accommodate additional space for passengers or equipment, the copilot's flight controls can be removed.

Refer to SIL 0179 for removal or installation instructions.

NOTE: Removal or installation of the copilot controls will change the helicopter weight and c.g. and shall be recorded on the Weight and Balance form (Figure 6.8).

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

O. Idle Mixture Operational Check

NOTE: For a change in base altitude operation, it is recommended to perform an idle mixture operational check.

NOTE: Any idle mixture adjustments may only be performed by an appropriately rated mechanic.

1. Operate the helicopter to normal temperature and pressure ranges.
2. Verify the magneto operation.
   a. Maximum engine drop: 125 rpm
   b. Maximum TIT rise: 100 °F
3. Perform normal cool down.
   a. 1 minute at 2000 engine rpm
   b. 2 minutes with throttle off and clutch disengaged
4. Verify idle is between 1450-1500 rpm.
5. Maintain boost pump ON.
6. Slowly lean the engine and observe engine rpm.

   NOTE: Move mixture to full rich before the engine quits.

   a. If the rpm rises during leaning – idle mixture is rich.
   b. If the rpm drops immediately – idle mixture is lean.
7. Engage clutch:
   a. Accelerate engine to 2500 RPM.
   b. If engine stumbles during acceleration, the idle mixture is too lean.
8. If the preceding idle mixture operational check is unsatisfactory, maintenance action is required before flight.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 9

OPERATIONAL INFORMATION

NOT FAA APPROVED

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

I. GENERAL OPERATION

A. Slope Landings

Slope landings have been demonstrated with the slope 90° either side of the nose up to a maximum of 15°.

CAUTION: Caution must be exercised when landing on slopes that available cyclic travel is not exceeded. Also, if any droop stop pounding is encountered as the collective is lowered the landing must be aborted and a slope with less angle selected.

B. Bird Strike

The probability of a damaging bird strike increases with decreasing altitude and with increasing airspeed. Operating in areas of high concentrations of birds or flocking birds also increases the probability of a bird strike. When operating at lower altitudes, including during takeoff and climb-out, flying at lower airspeeds decreases the probability of a bird strike and will reduce the severity should one occur. Though regional differences exist during spring and fall migration periods, operating at altitudes below 2,500 fee AGL increases the likelihood of a damaging bird strike.

C. Base Altitude Change

1. If the helicopter is operated out of a base at an altitude of 6000 ft or higher, the autorotation RPM should be checked and readjusted as necessary. In addition, if the helicopter was operated out of a base above 6000 ft and is moved to a lower altitude, the autorotation RPM should be checked and readjusted as necessary. Refer to Section 8, Paragraph V, Sub-paragraph K for performing an autorotation RPM check.

2. For changes in base altitude, the idle mixture should be checked and readjusted as necessary. Refer to Section 8, Paragraph V, Sub-paragraph O for performing an idle mixture operational check.

II. FLIGHT CHARACTERISTICS

A. Retreating Blade Stall

1. Retreating blade stall occurs at higher forward speeds when a portion of the retreating blade stalls because of the reduced relative velocity of airflow over the blade at high blade angles. When the airspeed of the tip of the retreating blade falls below a predetermined value, or when a relative blade angle exceeds a predetermined value, blade stall will be experienced. If blade pitch is increased (as with increased collective or forward cyclic control), or if the forward speed is increased, the stalled portion of the rotor disc increases, and the stall progresses from the tip toward the root of the retreating blade. During maneuvers that increase the g-load, such as sharp turns or high-speed flares from diving descents, where

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

rapid application of collective or cyclic pitch control is involved, severe blade stall may be encountered. Severe blade stall may also be encountered in turbulent air by gust-induced load factors or corrective control applications by the pilot. In the stall condition, each main rotor blade will stall as it passes through the stall region, creating a three per rev vibration. When significant blade stall is encountered a mild roughness will be noted along with some cyclic control feedback that will cause the cyclic to have a tendency to displace aft of the trimmed position. The vibration due to the blade stall will increase as blade stall progresses, as will the requirement for forward force to maintain the cyclic in the initial trimmed position. Both of these cues should provide adequate warning that blade stall is being encountered. Severe turbulence or abrupt control movement at this point will increase the severity of the stall but will not cause any loss of control to occur. In this helicopter, there is not as pronounced a tendency for the fuselage to pitch up and roll left in response to the rotor stalling as may be experienced in other helicopters, but if the rotor is held in a stalled condition and the blade stall is aggravated, the helicopter will eventually exhibit this pitch and roll tendency. Even though blade stall may be encountered, the helicopter is fully controllable even in severe blade stall because of the blade design and the high rotor control power inherent in this rotor design. Blade stall may be eliminated by any or all of the following actions:

a. Gradually decrease the severity of the maneuver.

b. Gradually decrease collective pitch.

c. Gradually decrease airspeed.

B. Vortex Ring State (Settling With Power)

CAUTION: Flight conditions causing Vortex Ring State should be avoided at low altitudes because of the loss of altitude necessary for recovery.

1. Vortex Ring State may occur when a helicopter is flown below translational lift with more than 20% power applied and a descent rate over 300 feet per minute. Under this condition, the helicopter is descending through the air displaced by its own rotor system. The downwash then recirculates through the helicopter rotor system and results in reduced rotor efficiency. This condition can be recognized by increased roughness accompanied by a rapid build-up in rate of descent. Increasing collective pitch alone only tends to aggravate the situation. The Vuichard technique is very effective at recovering from settling with power. This technique uses the tail rotor thrust and the cyclic to move the advancing blade into clear air, at which point the vortex ring will dissipate. Recovery can be completed with much less altitude loss than with traditional techniques.

2. The Vuichard technique can be performed as follows: Simultaneously, apply sufficient right cyclic to cause a 10° to 20° bank, apply left pedal to maintain heading, and increase collective.

3. During approach for landings at high gross weights, conditions associated with Vortex Ring State should be avoided.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

C. Loss of Tail Rotor Effectiveness

1. Loss of tail rotor effectiveness (LTE) is a phenomenon which can occur in any single main rotor/anti-torque tail rotor helicopter. Although the F-28F has a very effective tail rotor and does not exhibit any tendencies for LTE, the pilot should be aware that the potential for LTE, however small, does exist. As such, pilots should be aware of the causes and recovery techniques. There are a number of factors which reduce the effectiveness of the tail rotor or increase the thrust required from the tail rotor. These factors include high power settings, low airspeeds, low rotor RPM, left crosswinds or tailwinds, and right, yawing turns. Under exactly the right conditions, these factors can combine to make the tail rotor virtually ineffective. This LTE can be recognized by an uncommanded right yaw which cannot be stopped using the tail rotor pedal alone. Recovery from LTE can be accomplishedby increasing forward speed, lowering the collective if altitude permits, and applying left pedal. The longer corrective actions are delayed, the more difficult it will be to recover from LTE.

D. Ground Resonance

1. Ground resonance is an aerodynamic phenomenon associated with fully articulated rotor systems. It develops when the rotor blades move out of phase with each other and cause the rotor disc to become unbalanced. The chance of encountering ground resonance in the F-28F is very remote; however, the potential does exist if the main rotor dampers or oleo struts are severely degraded or damaged.

2. If severe vibrations are encountered on the ground when bringing the main rotor rpm up to operating speed, immediately turn the throttle to the flight idle position. If severe vibrations are encountered when the main rotor rpm is at operating speed, immediately hover the aircraft and allow the vibrations to dampen. Attempt to land the aircraft. If severe vibrations are encountered again, immediately hover the aircraft, allow the vibrations to dampen, and perform a hovering autorotation.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 10

SUPPLEMENTS

REVISIONS:

Issued: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SUPPLEMENT 1
WET/DRY DISPERSAL SYSTEM
SECTION 1 - GENERAL

I. INTRODUCTION

This supplement must be attached to the Approved Rotorcraft Flight Manual when the wet/dry dispersal system is installed. Operation in compliance with Section 2 of the Approved Rotorcraft Flight Manual is mandatory except as modified by this Flight Manual Supplement. Other approved sections and supplemental data are recommended procedures.

II. DESCRIPTION

This aircraft is approved for restricted category operations when agricultural spray equipment is installed in compliance with Enstrom Helicopter Drawing 28-22620. (Initial installation of electrical components, pump, clutch control, rails, drive system, boom attach fittings and upper tank attach fittings must be performed by a certified mechanic and entered in the airframe log.) After initial installation, removal or installation of wet/dry dispersal system may be accomplished by owner or operator.

REVISIONS:

Issued: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 2 - OPERATING LIMITATIONS

I. AIRSPEED LIMITATIONS — Maximum operating speed at 85 mph IAS at sea level power on and power off, linear decrease to 80 mph IAS at 6000 ft H_D, linear decrease to 57 mph IAS at 9000 ft H_D.

II. ALTITUDE LIMITATIONS — 9000 ft density altitude

III. WEIGHT LIMITATIONS

A. Maximum gross weight — 2600 lbs

B. Maximum load per dispersal tank — 350 lbs

IV. CENTER OF GRAVITY LIMITATIONS

A. 96.5 inches to 98.0 inches at 2600 lbs

B. Weights lower than 2600 lbs, see Figure 10.1.6.

V. TYPE OF OPERATION — Approved for restricted category operations under provisions of FAR 137.

VI. PLACARDS - on tank:

"RESTRICTED"

"AGRICULTURAL OPERATIONS ONLY"

"MAXIMUM LOAD PER DISPERSAL TANK - 350 LBS"

In view of pilot:

RESTRICTED CATEGORY
NEVER EXCEED SPEEDS - MPH IAS

Pressure Altitude	Outside Air Temperature, °F						
	-20	0	20	40	60	80	100
SL	85	85	85	85	85	85	85
1000	85	85	85	85	85	83	82
2000	85	85	85	84	83	82	81
3000	85	85	84	83	82	81	80
4000	85	84	83	82	81	80	69
5000	84	83	82	81	80	68	57
6000	83	82	81	80	68	60	
7000	82	81	79	68	60		
8000	81	80	69	61			
9000	80	72	59				

REVISIONS:

FAA Approved: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

I. LIQUID JETTISON

Jettison liquid by actuating dump valve switch on cyclic stick. A slight pitch up can be anticipated. Adjust cyclic control accordingly.

NOTE: Jettison tests were performed with one dump valve inoperative to produce maximum lateral load, and the demonstration showed negligible effect on lateral control.

II. LOSS OF POWER

Enter autorotation, jettison load immediately, and follow normal Flight Manual procedures.

III. LOSS OF TAIL ROTOR

Enter autorotation, jettison load immediately, and follow normal Flight Manual procedures.

IV. In the event of sudden onset of a severe 1/rev vibration, jettison load immediately and land helicopter. Check and/or repair main rotor dampers as appropriate before further flights.

V. SPREADER MALFUNCTION

If increasing cyclic displacement is required for hover or forward flight, land immediately and check loading situation and spreader operation.

REVISIONS:

FAA Approved: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 4 - NORMAL PROCEDURES

I. PREFLIGHT CHECK

A. Check sprayer system controls. Clutch control handle and spray "on" and "off" switch on cyclic stick.

B. Check spray tank booms for security.

C. Check spray tank for security and freedom of movement against springs.

D. Check security of pump belts and mounting hardware.

II. Before takeoff, lift guard on emergency dump switch.

III. HOVER CHECK

Check aircraft response in hover at maximum gross weight (i.e., full Ag tanks) to insure proper damper operation and proper tank isolation prior to commencing operation.

REVISIONS:

FAA Approved: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 5 - PERFORMANCE

RESTRICTED CATEGORY

$V_{never\ exceed}$ VS DENSITY ALTITUDE

V_{NE} demonstrated at 334 rotor rpm

All gross weights with wet/dry dispersal system installed

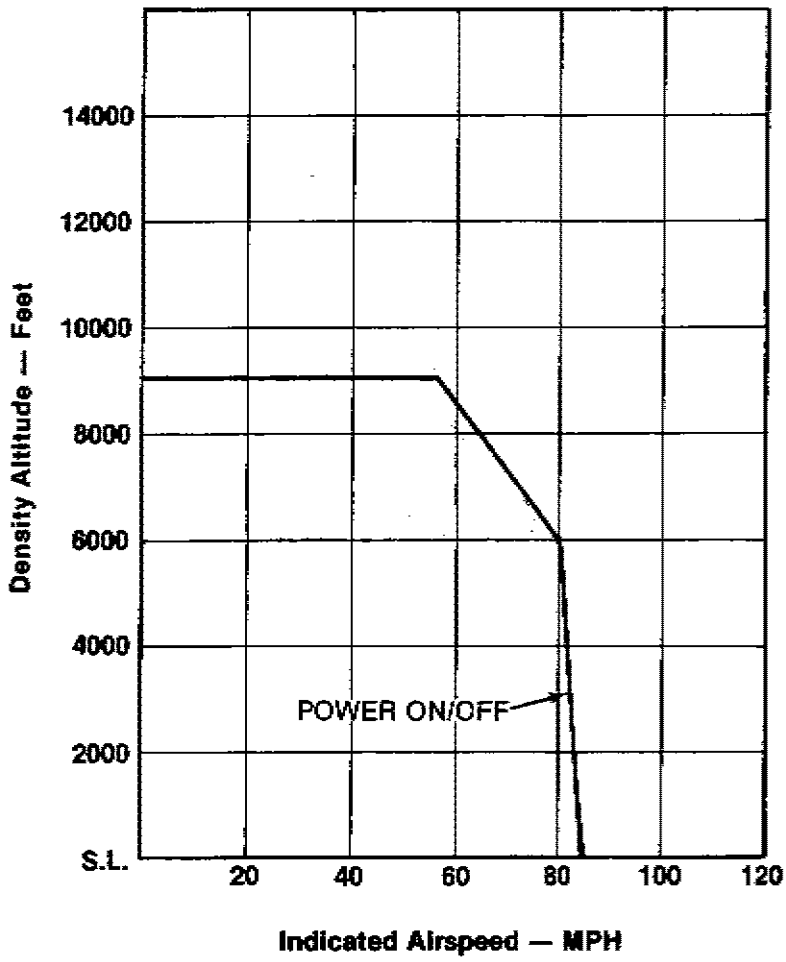


FIGURE 10.1.1

FAA Approved: 12/31/80
Revised: 7/1/84

REVISIONS: -

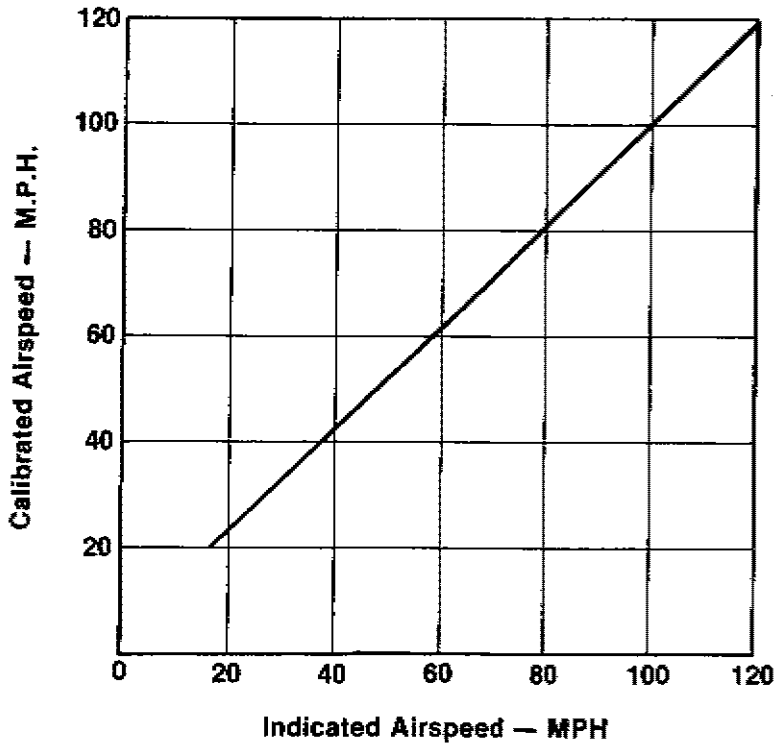
Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

AIRSPEED CALIBRATION

2600 LB. GR. WT.

AG TANKS AND BOOMS



NOTE: Indicated speeds below 20 MPH are not reliable.

FIGURE 10.1.2

FAA Approved: 12/31/80
Revised: 1/30/84

REVISIONS:

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

ENSTROM 280F

HOVER CEILING IN-GROUND EFFECT

2 FT SKID HEIGHT

350 ROTOR RPM

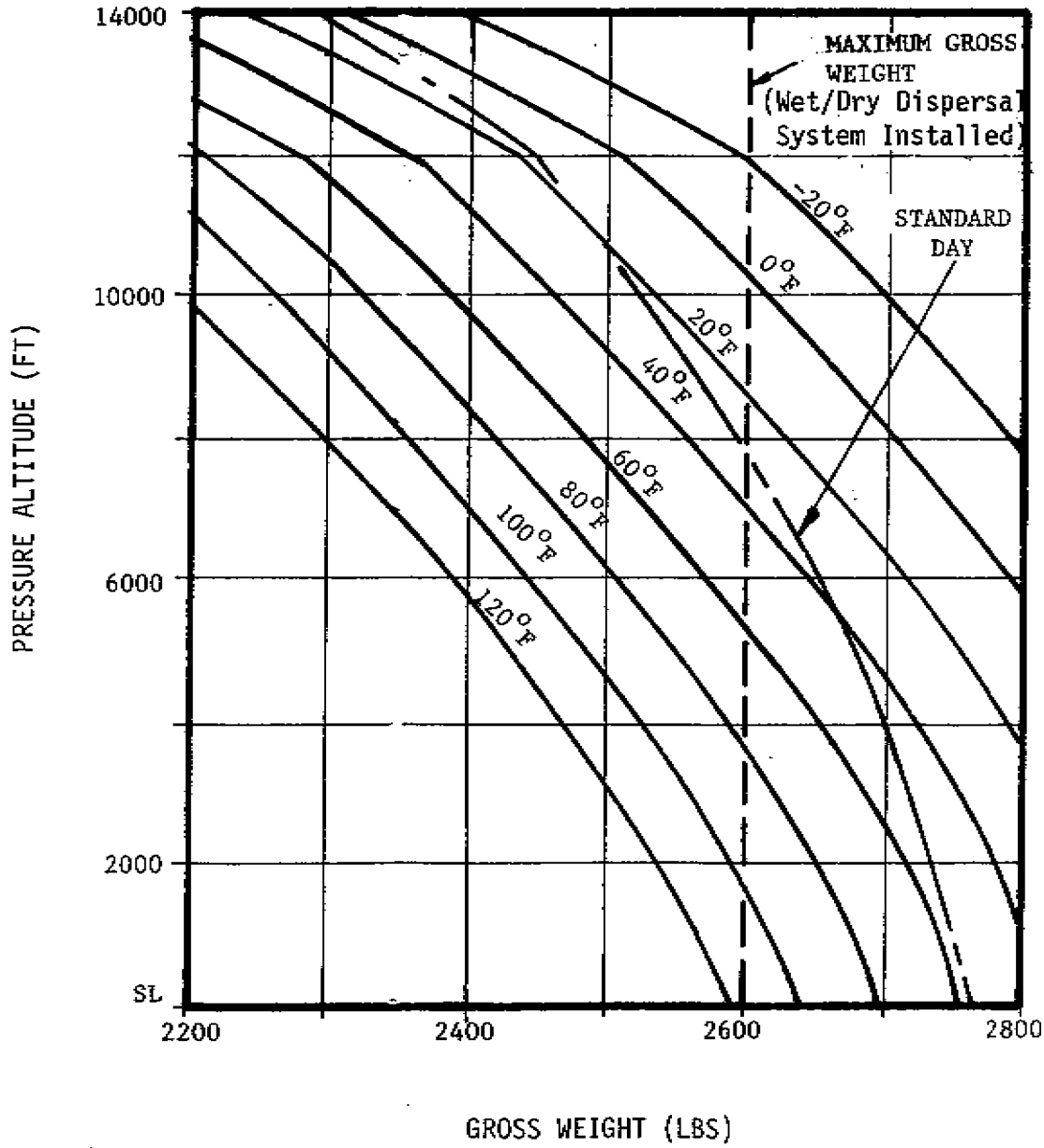


FIGURE 10.1.3

FAA Approved: 12/31/80
Revised: 7/1/84

REVISIONS:

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

ENSTROM 280F

HOVER CEILING OUT-OF-GROUND EFFECT

40 FT SKID HEIGHT

350 ROTOR RPM

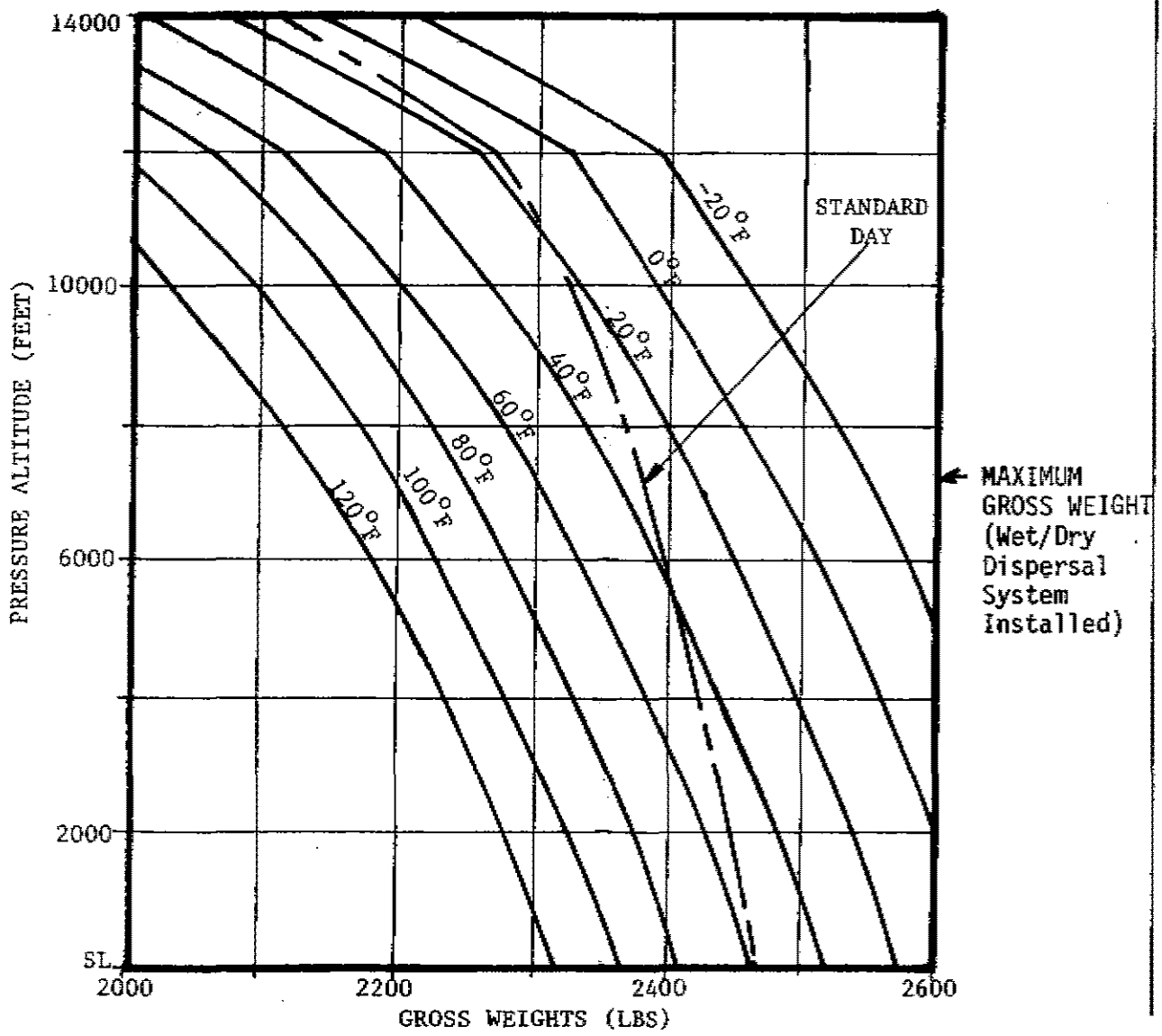


FIGURE 10.1.4

REVISIONS:

FAA Approved: 12/31/80
Revised: 7/1/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

HEIGHT VELOCITY DIAGRAM

(Tests conducted on prepared surfaces with internal ballast and without spray booms at SL and 7000 ft density altitude.

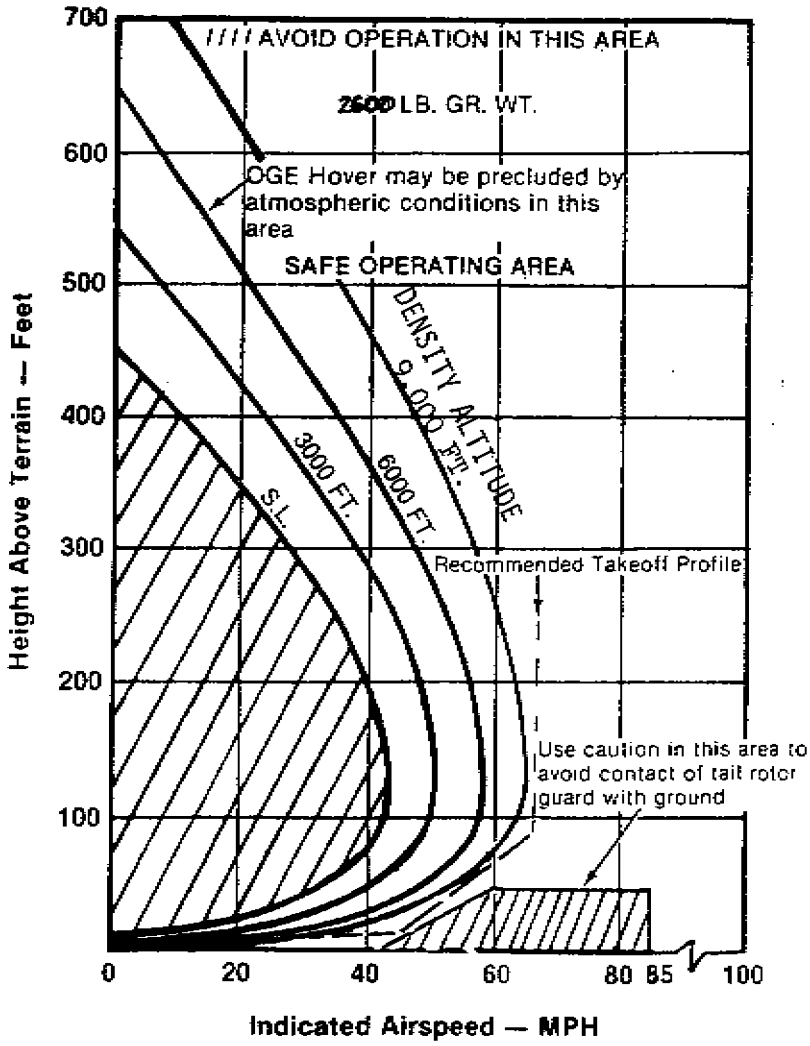


FIGURE 10.1.5

FAA Approved: 12/31/80

REVISIONS:

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 6 - WEIGHT AND BALANCE

Items to be used with basic Flight Manual Forms F-165A and F-168A for helicopter weight and c.g. calculations:

ITEMS	WEIGHT	ARM	MOMENT
Wet system - removable portion	113.65	107.77	12,247.59
Dry system - removable portion	71.35	97.60	6,963.47
Items remaining on helicopter (normal category)	13.25	89.90	1,191.12
Dispersal tank load		95.00	

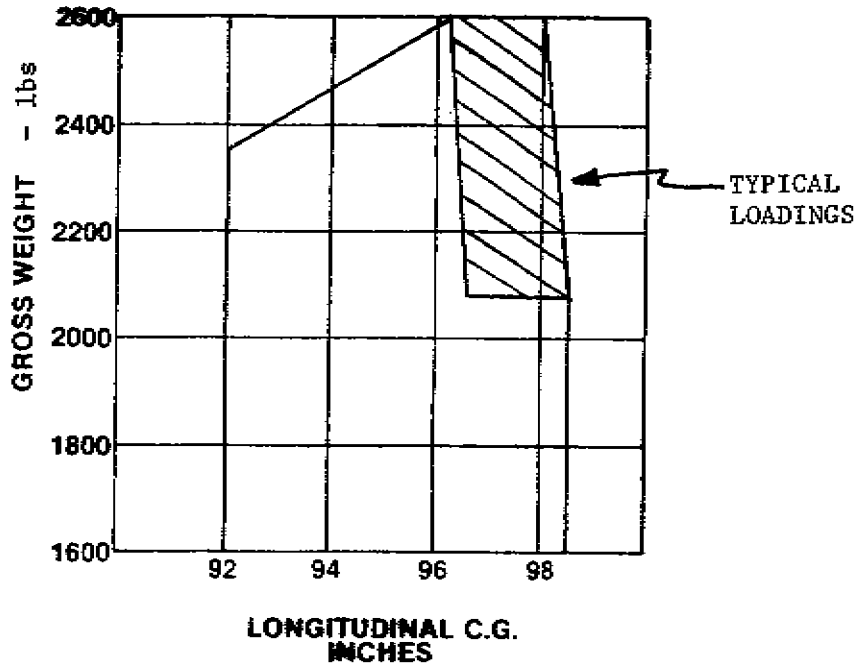


FIGURE 10.1.6

REVISIONS:

Issued: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 7 - AIRCRAFT AND SYSTEMS DESCRIPTION AND INSTALLATION INSTRUCTIONS

I. Initial installation - see Enstrom drawing 28-22620 and handbook "Installation Instructions and Parts List, Combination Wet/Dry Ag Kit 831000."

II. The following dispersal system items may remain on the helicopter for normal category operations.

A. Rail assembly

B. Power take-off assembly

C. Strut fittings and upper tank fittings

D. Pressure gage

E. Clutch control

F. Electrical harness and switches

III. Installation Procedures - Wet Dispersal System

A. Position tanks on rails and secure with 4 clevis pins (upper and lower).

NOTE: Check internal tank mounting. Isolation mount spring should be in free state (no preload with tank empty). One inch of threaded rod should be visible outboard of spring retention check nut.

B. Position wet center section on rails and secure with clevis pins.

C. Attach cross feed assembly to spray tanks, secure with over center latch and safety wire, and install 2 hoses to center section.

D. Attach clutch control cable.

E. Remove tape securing belt to jack strut and place belt on power takeoff.

F. Connect pressure sender valve motor and emergency dump motor electrical plugs.

G. Attach spray booms and safety.

H. Inspect system and perform operational check.

I. Make log book entry: "Wet dispersal system installed. Helicopter approved for restricted category operations only."

REVISIONS:

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

IV. Installation Procedures, Dry Dispersal System

A. Position tanks on rails and secure with 4 clevis pins.

NOTE: Check internal tank mounting. Isolation mount spring should be in free state (no preload with tank empty). One inch of threaded rod should be visible outboard of spring retention check nut.

B. Install right side spreader under tank and secure with overcenter latch (butterfly valve aft) and safety wire. Connect electrical plug to valve motor.

C. Install left spreader under tank.

D. Install and adjust linkage between butterfly valves.

E. Install angle drive using 2 clevis pins, and safety.

F. Install "V" belt and adjust tension.

G. Install left and right take-up assemblies.

H. Install long "V" belt to each spreader (lower to right spreader) and adjust tension.

I. Inspect system and perform operational check.

J. Make log book entry:

"Dry dispersal system installed, helicopter approved for restricted category operations only."

V. To return helicopter to normal category:

A. Remove wet dispersal system following steps III (A-G) in reverse, or remove dry dispersal system following steps IV (A-H) in reverse.

B. Cap electrical plugs, fasten ends to rail or cross tube with tape or bundle ties.

C. Fasten clutch cable to cross tube.

D. Tape "V" belt to jackstrut.

E. Inspect helicopter.

NOTE: Possible deterioration of rubber parts and corrosion of helicopter may occur when certain dispersants are used. Inspection intervals and cleaning procedures should be modified to prevent damage.

REVISIONS:

Issued: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

F. Make log book entry:

"Wet/dry dispersal system removed except for allowance provisions remaining on helicopter. Helicopter approved for normal category operations."

REVISIONS:

Issued: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SUPPLEMENT 2
FLOAT LANDING GEAR

SECTION 1 - GENERAL

I. INTRODUCTION

This supplement must be attached to the Approved Rotorcraft Flight Manual when the Enstrom Float Landing Gear Kit No. 28-17326 is installed. Operation in compliance with Section 2, Operating Limitations, of the basic manual is mandatory except as modified by this supplement. Other approved section and supplemental data are recommended procedures.

II. DESCRIPTION

The 28-17326 Float Landing Gear Kit consists of two multi-cell (five compartment) Air Cruisers No. D 24780 inflatable floats, attachment fittings, relocated pitot tube, lengthened universal blocks and modified horizontal stabilizer installation.

REVISIONS:

Issued: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 2 - OPERATING LIMITATIONS

I. TYPE OF OPERATIONS

This helicopter is approved for operation under day VFR - non-icing conditions only.

II. AIRSPEED LIMITATIONS

A. Never Exceed Speeds:

Envelope A V_{NE} 100 mph IAS from SL to 3000 ft H_d. For variations greater than 3000 ft H_d, see Placard and Figure 10.2.1.

NOTE: In order to operate this helicopter in Envelope B or in Envelope D normal category, this helicopter must meet the requirements of Enstrom Specification Drawing No. 28-100015. See Limitations Section of Basic Rotorcraft Flight Manual.

Envelope B V_{NE} 94 mph IAS from SL to 3000 ft H_d. See Placard and Figure 10.2.1 for variations with altitude.

Envelope D V_{NE} 85 mph IAS at SL. See Placard and Figure 10.2.1 for variations with altitude.

NOTE: For float operations, envelopes C and D have been combined.

III. ALTITUDE LIMITATIONS

A. See Section 4-IV of this Supplement, Base Altitude Change.

IV. CENTER OF GRAVITY LIMITATIONS

A. See Section 6-II of this Supplement for approved c.g. limits and lateral offset moment.

REVISIONS:

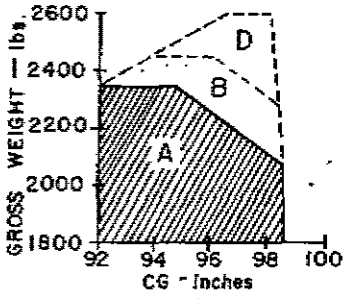
FAA Approved: 12/31/80
Revised: 7/1/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

V. PLACARDS

NEVER EXCEED SPEEDS (V_{NE}) MILES PER HOUR IAS. (Located overhead above center windshield.)

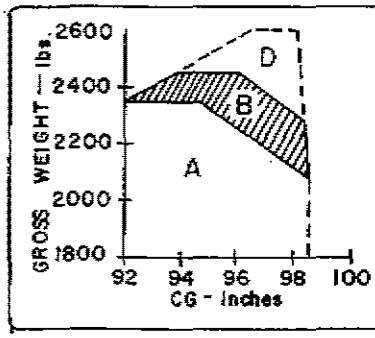


VNE-IAS (MPH) FOR ENVELOPE 'A' WITH FLOATS

PRESSURE ALTITUDE	OUTSIDE AIR TEMPERATURE °F						
	-20	0	20	40	60	80	100
SEA LEVEL	100	100	100	100	100	100	100
2000	100	100	100	100	100	97	93
4000	100	100	100	97	93	88	82
6000	100	98	94	88	82	75	68
8000	95	90	82	75	68	62	55
10000	84	77	69	62	55		
12000	70	63	55				

28-180055-11

A

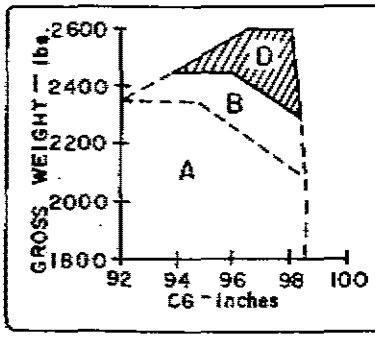


VNE-IAS (MPH) FOR ENVELOPE 'B' WITH FLOATS

PRESSURE ALTITUDE	OUTSIDE AIR TEMPERATURE °F						
	-20	0	20	40	60	80	100
SEA LEVEL	94	94	94	94	94	94	94
2000	94	94	94	94	94	92	89
4000	94	94	94	92	89	85	77
6000	94	93	89	85	77	70	63
8000	90	86	78	70	62		
10000	80	71	63	56			
10800	74	65	59				

28-180056-11

B



VNE-IAS (MPH) FOR ENVELOPE 'D' WITH FLOATS

PRESSURE ALTITUDE	OUTSIDE AIR TEMPERATURE °F						
	-20	0	20	40	60	80	100
SEA LEVEL	85	85	85	85	85	84	83
2000	85	85	85	84	83	82	81
4000	85	84	83	82	81	78	69
6000	83	82	81	79	69	59	
8000	81	80	70	60			
9000	80	71	60				

28-180057-11

D

REVISIONS:

Issued: 12/31/80
Revised: 7/1/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

I. ENGINE FAILURE DURING FLIGHT (ABOVE 80 MPH)

A. Maintain heading with antitorque pedals and apply aft cyclic to reduce airspeed while simultaneously lowering collective pitch.

B. Stabilize at 58 mph.

NOTE: Night operation - turn on landing light.

C. At about 75 feet above ground or water, apply aft cyclic to reduce forward speed.

D. When about 20-25 feet above surface, begin to level helicopter and apply collective pitch as necessary to cushion a level landing.

WARNING: Touchdown speeds should be kept below 20 mph for emergency autorotative water landings, especially with forward c.g.

II. ENGINE FAILURE DURING FLIGHT (BELOW 80 MPH)

A. Enter normal autorotation and stabilize at 58 mph.

NOTE: Night operation - turn on landing light.

B. Use same procedure as steps C and D of above procedure.

REVISIONS:

FAA Approved: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 4 - NORMAL PROCEDURES

I. ROTOR ENGAGEMENT (ON WATER)

Prior to engaging the rotor the helicopter should either be secured or set adrift in an area sufficient to make at least one-half rotation due to engagement rotor torque. Allowance should be given to helicopter drift.

Apply full left pedal and then follow normal engagement procedures until needles marry, then smoothly advance throttle until tail rotor becomes effective (approximately one-half helicopter revolution or 1800 engine rpm).

II. FLIGHT INFORMATION

Taxi at slow speeds with partial collective to prevent float bows from nosing under. Safe taxiing has been demonstrated in waves up to 18 inches (trough to crest).

III. RUNNING LANDING

A. Maximum recommended water contact speed is 30 mph. Reduce speed on rough water.

B. After water contact, avoid rapid lowering of collective pitch.

NOTE: To avoid possible float damage on land, use minimum ground contact speed.

IV. BASE ALTITUDE CHANGE

Before flight, check float pressure. Normal pressure is 1.5 psig.

A. For flights to lower altitude - over-inflate at base altitude .5 psig per 1000 feet anticipated altitude change. (6.5 psig maximum inflation pressure.)

NOTE: This includes the normal ambient temperature variations associated with changes in altitude.

B. For flights to higher altitude - 10,000 feet differential altitude permitted (provided float pressure is not more than 1.5 psig at takeoff).

C. For variations in ambient air temperature and/or water temperature at a given base altitude use the following procedure. When an ambient air temperature or water temperature colder than the temperature at initial inflation is anticipated, over inflate, .5 psig above normal for each 15°F decrease in temperature anticipated.

REVISIONS:

FAA Approved: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 5 - PERFORMANCE

I. No change from basic flight manual except as indicated in the following charts:

Figure 10.2.1 $V_{never\ exceed}$ vs. density altitude

Figure 10.2.2 Airspeed Calibration

II. RATE OF CLIMB

Reduce rate of climb by 150 feet per minute from that obtained from Figure 5.8 of the basic flight manual.

REVISIONS:

FAA Approved: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

$V_{NEVER\ EXCEED}$ VS DENSITY ALTITUDE

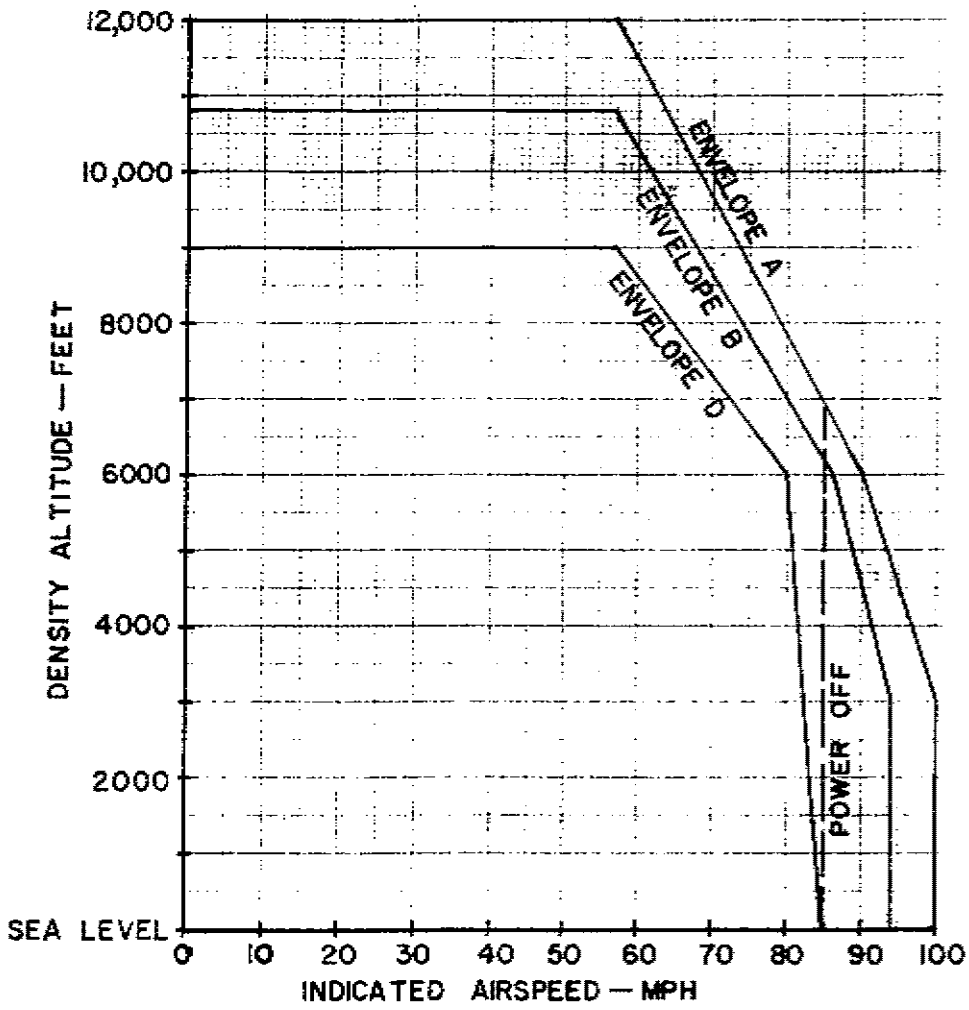


FIGURE 10.2.1

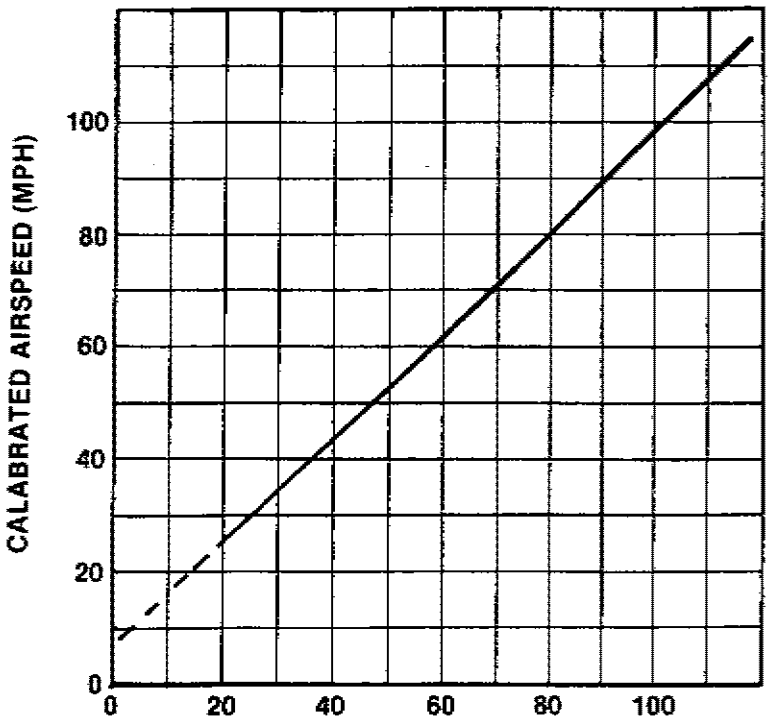
FAA Approved: 12/31/80
Revised: 7/1/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

AIRSPEED SYSTEM
CALIBRATION CURVE

MODEL 280F WITH FLOAT PITOT SYSTEM



(ASSUMES ZERO INSTRUMENT ERROR)

FIGURE 10.2.2

REVISIONS:

FAA Approved: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 6 - WEIGHT & BALANCE

I. A new weight and balance should be calculated per the instructions in Section 6 of the basic flight manual using the following information:

OPTIONAL EQUIPMENT	WEIGHT	ARM	MOMENT
Float landing gear	75.0 lbs	107 in	8025 in-lbs
Wheel & bracket removal	-15.0 lbs	113.5 in	-1703 in-lbs

II. CENTER OF GRAVITY LIMITS:

A. There are three gross weight/c.g. envelopes for this helicopter with floats installed. See Figure 10.2.3. Each envelope corresponds to one of three V_{NE}/altitude envelopes as described in paragraph 2-II of this supplement. See also Figure 10.2.1.

B. Envelope A is the lightest weight envelope with limits as follows:

1. Upper weight limit is 2350 lbs.

2. Forward limit at 92.0 inches.

3. Aft limit varies linearly from 94.6 in. at 2350 lbs to 98.5 inches at and below 2070 lbs.

NOTE: In order to operate this helicopter in Envelope B or in Envelope D, normal category, this helicopter must meet the requirements of Enstrom Specification Drawing No. 28-100015. See Limitation Section of Basic Rotorcraft Flight Manual.

C. Envelope B is the next heavier envelope with limits as follows:

1. Upper weight limit is 2450 lbs.

2. Forward limit varies linearly from 93.8 in. at 2450 lbs to 92.0 in. at 2350 lbs.

3. Aft limit varies from 96.0 in. at 2450 lbs to 98.3 in. at 2280 lbs and 98.5 in. at 2070 lbs.

4. Lower limit corresponds to the upper forward and aft limit of Envelope A.

D. Envelope D is the heaviest envelope with limits as follows:
(For float operations, Envelope C has been combined with Envelope D.)

1. Upper weight limit is 2600 lbs.

2. Forward limit varies linearly from 96.5 in. at 2600 lbs to 93.8 in. at 2450 lbs.

REVISIONS:

Issued: 12/31/80
Revised: 7/1/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

3. Aft limit varies linearly from 98.0 in. at 2600 lbs to 98.3 in. at 2280 lbs.

4. Lower limit corresponds to the upper forward and aft limits of Envelope B.

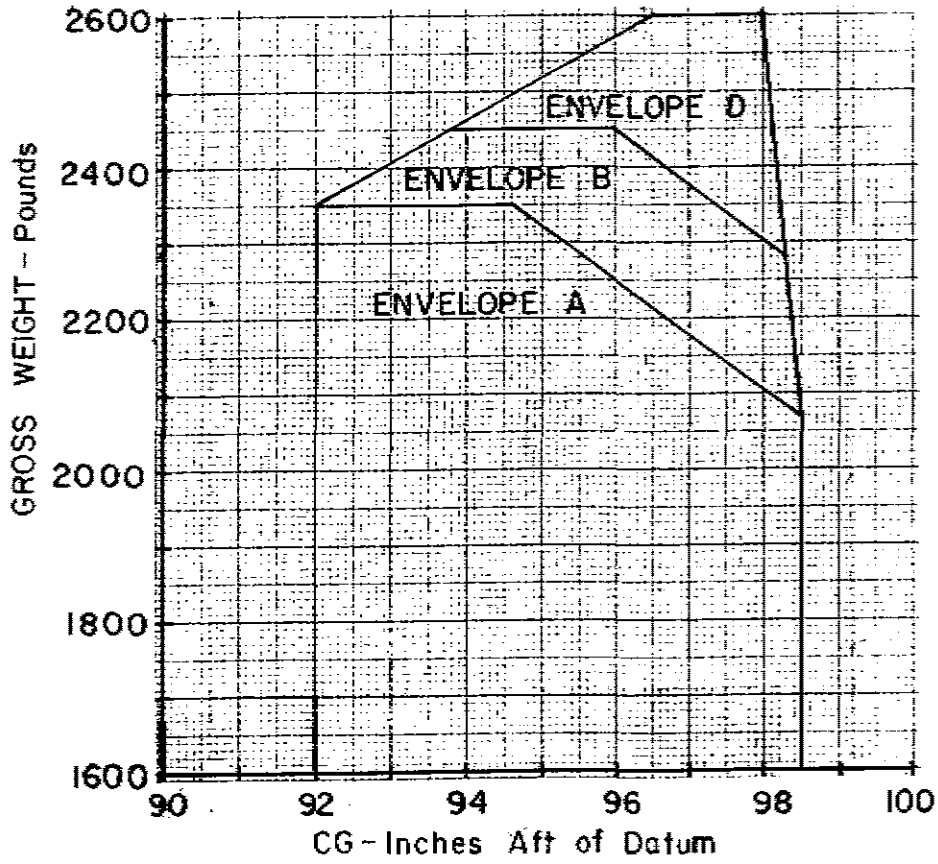


FIGURE 10.2.3

REVISIONS:

Issued: 12/31/80
Revised: 7/1/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SUPPLEMENT 3
EXTERNAL LOADS

SECTION 1 - GENERAL

I. INTRODUCTION

This supplement must be attached to the Approved Rotorcraft Flight Manual when the Enstrom Cargo Hook Kit No. 28-22000 is installed and utilized for transportation of external cargo. Operation in compliance with Section 2, Operating Limitations, of the Approved Rotorcraft Flight Manual is mandatory except as modified by this supplement. Other approved sections and supplemental data are recommended procedures.

II. DESCRIPTION

This aircraft is certified for multiple certificate operation at gross weights up to 2600 lbs for restricted category cargo hook operations. A log book entry shall be made when changing category of operation.

This Cargo Hook Kit incorporates electro-mechanical cargo release features.

REVISIONS:

Issued: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 2 - OPERATING LIMITATIONS

I. ENGINE LIMITS

3050 rpm, 39.0 in. MAP (225 HP).

II. AIRSPEED LIMITATIONS

When operating with an external load, use Envelope D airspeed limits. Refer to Basic Rotorcraft Flight Manual for airspeed limits when operating without external load.

CAUTION: The maximum safe airspeed for satisfactory handling characteristics is dependent upon many variables, i.e., aerodynamic shape, load, c.g. of load, length of sling, location of suspension points and rate of climb or descent. Caution should be exercised as the onset of unsatisfactory handling characteristics may be abrupt.

III. ALTITUDE LIMITATIONS - Same as Basic Rotorcraft Flight Manual

IV. WEIGHT LIMITATIONS

A. The total weight of the helicopter and load combination shall not exceed 2600 lbs. See FAR 133, Subpart D.

B. Maximum external load: 1000 lbs.

V. CENTER OF GRAVITY LIMITATIONS - Same as Basic Rotorcraft Flight Manual

A. Lateral offset moment: for weights 2350 lbs and under, see Basic Rotorcraft Flight Manual.

B. Lateral offset moment: For operations above 2350 lbs, -1620 in-lbs to -3250 in-lbs.

VI. TYPE OF OPERATIONS

A. Approved for multiple certificate operations under provisions of FAR 133 for Class B Rotorcraft-Load Combinations.

B. Normal operations under FAR Part 91 can be conducted with the cargo hook installed, providing external cargo is not being transported.

REVISIONS:

FAA Approved: 12/31/80
Revised: 7/1/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

VII. PLACARDS

A. Placards in view of pilot:

APPROVED FOR CLASS B ROTORCRAFT-LOAD OPERATION
OCCUPANCY LIMITED TO SOLO PILOT WHEN CARRYING EXTERNAL LOAD
USE ENVELOPE D NEVER EXCEED SPEEDS

B. Installed on cargo hook:

EXTERNAL LOAD LIMIT 1,000 LBS

REVISIONS:

Issued: 12/31/80
Revised: 7/1/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

1. ELECTRICAL FAILURE

Pull mechanical manual release handle located on the pilot's cyclic stick just forward of the cyclic grip, to drop cargo in the event of an electrical failure.

NOTE: The cargo mechanical release will function regardless of position of CARGO RELEASE arming switch.

REVISIONS:

FAA Approved: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 4 - NORMAL PROCEDURES

I. PREFLIGHT OPERATION CHECK

A. Check electrical release system.

1. Turn master switch on.
2. Place instrument panel cargo release arming switch to the ON position.
3. Place a load (3 lbs minimum) on cargo hook beam.
4. Press upper switch on pilot's cyclic grip and the beam will release. If the momentary release switch is held in the ON position, the cargo hook beam will not relatch. After the switch is released, check to see if beam automatically re-latches.

B. Check mechanical release system (emergency release).

1. All switches OFF.
2. Place load (3 lbs minimum) on cargo hook beam.
3. Activate emergency release by pulling the "T" handle mounted on the pilot's cyclic stick. Approximately 1.5 inches of travel is required to release the cargo hook beam.
4. After load releases, push "T" handle in and check hook beam for automatic re-latching.

II. STATIC ELECTRICITY DISCHARGE

Provide ground crew with instructions as follows: Discharge helicopter static electricity before attaching cargo by touching the airframe with a ground wire, or if a metal sling is used, the hook-up ring can be struck against the cargo hook. If contact has been lost after initial grounding, the helicopter should be electrically regrounded and, if possible, contact maintained until hook-up is completed.

III. CARGO HOOK OPERATION

Position instrument panel CARGO RELEASE arming switch (circuit breaker) to OFF when attaching cargo, then move switch to ON as desired during approach for release. When cargo release is desired, press upper switch on pilot's cyclic grip.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 5 - PERFORMANCE

Use approved flight manual data.

SECTION 6 - WEIGHT & BALANCE

A new weight and balance should be calculated per the instructions in Section 6 of the Basic Flight Manual using the following information:

OPTIONAL EQUIPMENT	WT (LBS)	ARM (IN)	MOMENT (IN-LBS)
Cargo Hook Installation	15	95.50	1432.5
Hook Load		95.94	

Figure 10.3.1

REVISIONS:

Issued: 12/31/80
Revised: 7/1/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SUPPLEMENT 4
SNOWSHOE

SECTION 1 - GENERAL

I. INTRODUCTION

This supplement must be attached to the Basic Flight Manual when the Enstrom Snowshoe Kit No. 28-22400 is installed. Operation in compliance with Section 2 - Operating Limitations, of the Basic Flight Manual is mandatory except as modified by this supplement. Other approved sections and supplemental data are recommended procedures.

II. DESCRIPTION

The snowshoe kit consists of four snowshoe pads, two on each skid tube, and will permit landings in various snow conditions.

SECTION 2 - OPERATING LIMITATIONS

Same as Basic Flight Manual

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

Same as Basic Flight Manual

SECTION 4 - NORMAL PROCEDURES

Same as Basic Flight Manual

SECTION 5 - PERFORMANCE

Same as Basic Flight Manual

SECTION 6 - WEIGHT & BALANCE

A new weight and balance should be calculated per the instructions in Section 6 of the Basic Flight Manual using the following information:

OPTIONAL EQUIPMENT	WT (LBS)	ARM (IN)	MOMENT (IN-LBS)
Snowshoe Kit	18.0	100.9	1816.2

REVISIONS:

FAA Approved: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SUPPLEMENT 5

(RESERVED)

REVISIONS:

Issued: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SUPPLEMENT 6
RIGHT SIDE PILOT CONFIGURATION

SECTION 1 - GENERAL

I. INTRODUCTION

This supplement is attached to the basic flight manual when the aircraft is configured for the pilot flying from the right hand seat. Operation in compliance with the Basic Flight Manual is mandatory except as modified by this supplement. Other approved sections and supplemental data are recommended procedures.

II. DESCRIPTION

The right seat pilot configuration consists of a starter button located on the right hand collective control, a reverse orientation of flight instruments from standard, and the fuel shut-off (manual) located between the seats on the rear bulkhead, relocated battery position, and a manual clutch located on the right side of the pilot seat.

SECTION 2 - OPERATING LIMITATIONS

I. AIRSPEED LIMITATIONS - Same as Basic Flight Manual

II. WEIGHT LIMITATIONS - Same as Basic Flight Manual

III. CENTER OF GRAVITY LIMITATIONS - Same as Basic Flight Manual

REVISIONS:

FAA Approved: 6/26/81
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SUPPLEMENT 7

(RESERVED)

FAA Approved: March 28, 2017

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SUPPLEMENT 8
EMERGENCY FLOAT LANDING GEAR

SECTION 1 - GENERAL

I. INTRODUCTION

This supplement must be attached to the Basic Flight Manual when the Enstrom Float Landing Gear Kit No. 28-17301 is installed. Operation in compliance with Section 2, Operating Limitations, of the basic manual is mandatory except as modified by this supplement. Other approved sections and supplemental data are recommended procedures.

II. The 28-14301 Float Landing Gear Kit consists of two multi-cell, Air Cruisers No. D24409, inflatable floats, attachment fittings, relocated pitot tube, lengthened universal block and modified horizontal stabilizer installation.

III. The Emergency Float Landing Gear Kit is intended ONLY for emergency water landings.

REVISIONS:

Issued: 11/20/81
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 2 - OPERATING LIMITATIONS

I. TYPE OF OPERATIONS

This helicopter is approved for operation under day and night - VFR, non-icing conditions only. Intentional water landings and takeoffs are prohibited. Emergency water landings up to a maximum of 2350 lbs are permitted.

II. AIRSPEED LIMITATIONS

NEVER EXCEED SPEEDS: Never exceed speed (V_{NE}) is 100 mph IAS from SL to 3000 feet density altitude (H_d). For variations above 3000 ft H_d, see Placard in Paragraph V and Figure 10.8.1.

III. ALTITUDE LIMITATIONS

A. The maximum operating altitude is 12,000 feet density altitude.

B. See Section 4, Item I for maximum altitude variation from takeoff base altitude.

IV. CENTER OF GRAVITY LIMITS

A. Longitudinal

1. 92.0 in. to 94.6 in. at 2350 lbs.
2. 92.0 in. to 98.5 in. at 2070 lbs.

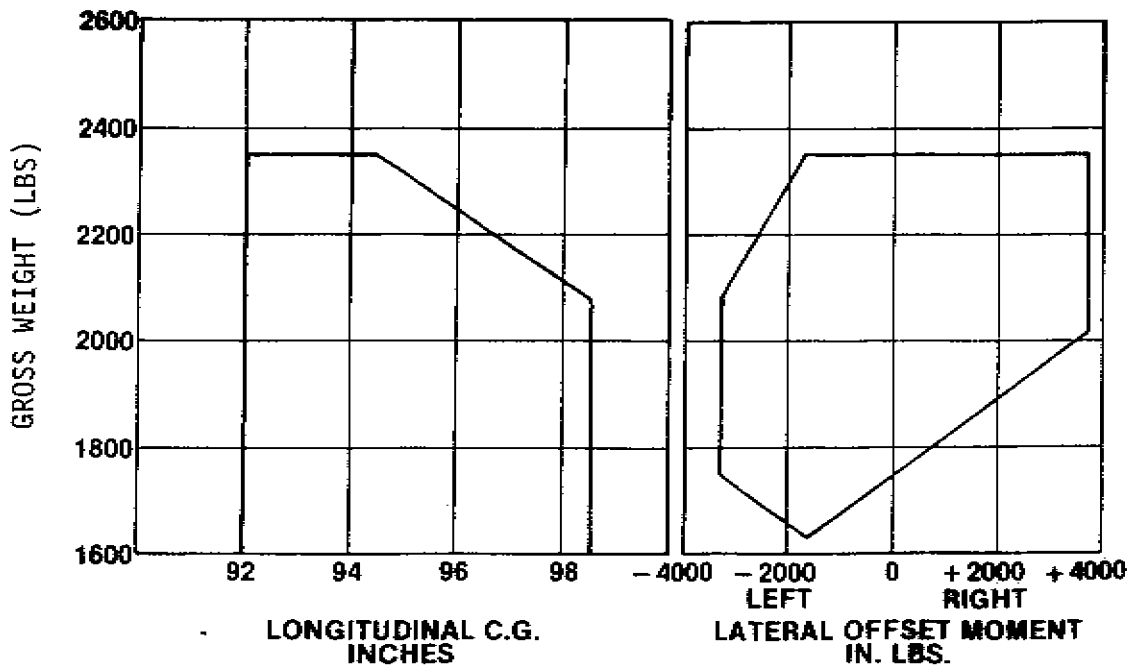
REVISIONS:

FAA Approved: 11/20/81
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

B. Lateral - See Lateral Offset Moment Chart below.



V. PLACARDS

NEVER EXCEED SPEEDS (V_{NE}) MILES PER HOUR IAS

Pressure Altitude	Outside Air Temperature, °F						
	-20	0	20	40	60	80	100
SL	100	100	100	100	100	100	100
2000	100	100	100	100	100	97	93
4000	100	100	100	97	93	88	82
6000	100	98	94	88	82	75	68
8000	95	90	82	75	68	62	55
10000	84	77	69	62	55		
12000	70	63	55				

NOTE: Airspeeds intentionally left blank represent density altitudes above approved maximum altitudes.

REVISIONS:

FAA Approved: 11/20/81
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

I. ENGINE FAILURE DURING FLIGHT (above 80 mph, IAS)

A. Maintain heading with antitorque pedals and apply aft cyclic to reduce airspeed while simultaneously lowering collective pitch.

B. Stabilize at 58 mph, IAS.

NOTE: Night operation - turn on landing light.

C. At about 75 feet above ground or water, apply aft cyclic to reduce forward speed.

D. When about 20-25 feet above surface, begin to level helicopter and apply collective pitch as necessary to cushion a level landing.

WARNING: Touchdown speeds should be kept below 20 mph for emergency autorotative water landings, especially with forward c.g.

II. ENGINE FAILURE DURING FLIGHT (below 80 mph, IAS)

A. Enter normal autorotation and stabilize at 58 mph IAS.

NOTE: Night operation - turn on landing light.

B. Use same procedure as steps C and D above.

REVISIONS:

FAA Approved: 11/20/81
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 4 - NORMAL PROCEDURES

I. BASE ALTITUDE CHANGE

Before flight, check float pressure. Normal pressure is 1.5 psig.

A. For flights where descent is to be below takeoff altitude - over-inflate at base altitude .5 psig per 1000 feet anticipated altitude change (6.5 psig maximum inflation pressure).

NOTE: This includes the normal ambient temperature variations associated with changes in altitude.

B. For flights to higher than takeoff altitude - 10,000 feet differential altitude permitted (provided float pressure is not more than 1.5 psig at takeoff).

C. For variations in ambient air temperature and/or water temperature at a given base altitude, use the following procedure: When an ambient air temperature or water temperature colder than the temperature at initial inflation is anticipated, over-inflate, .5 psig above normal for each 15°F decrease in temperature anticipated.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 5 - PERFORMANCE

I. No change from the basic flight manual except as indicated below:

Figure 10.8.1	$V_{never\ exceed}$ vs density altitude
Figure 10.8.2	Airspeed calibration

II. RATE OF CLIMB

Reduce rate of climb by 150 feet per minute from that obtained from page 5.8 of the basic flight manual.

REVISIONS:

FAA Approved: 11/20/81
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

$V_{never\ exceed}$ vs Density Altitude

Emergency Float Configuration

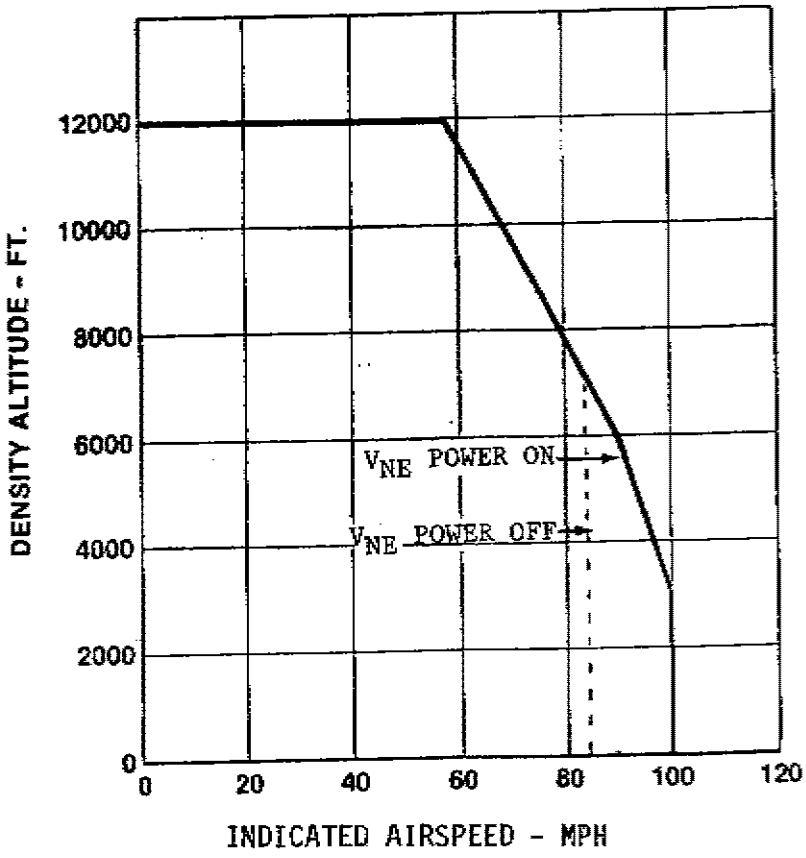


FIGURE 10.8.1

FAA Approved: 11/20/81
Revised: 1/30/81

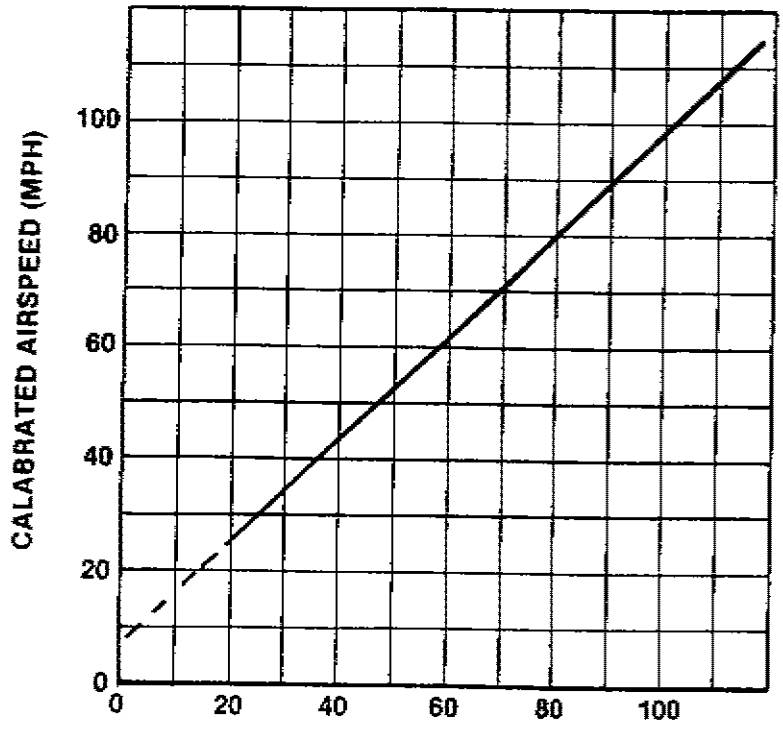
REVISIONS:

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

AIRSPEED SYSTEM
CALIBRATION CURVE

MODEL 280F WITH EMERGENCY FLOATS
2350 LBS



INSTRUMENT ERROR ZERO

FIGURE 10.8.2

FAA Approved: 11/20/81
Revised: 1/30/84

REVISIONS:

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 6 - WEIGHT AND BALANCE

I. A new weight and balance should be calculated per the instructions in Section 6 of the basic flight manual using the following information:

OPTIONAL EQUIPMENT	WEIGHT	LONG. ARM	LONG. MOMENT
Float landing gear	75.0 lbs	107 in	8025 in-lbs

II. CENTER OF GRAVITY LIMITS

A. Longitudinal

1. 92.0 in. to 94.6 in. at 2350 lbs

2. 92.0 in. to 98.5 in. at 2070 lbs

B. Lateral - see Figure 10.8.3

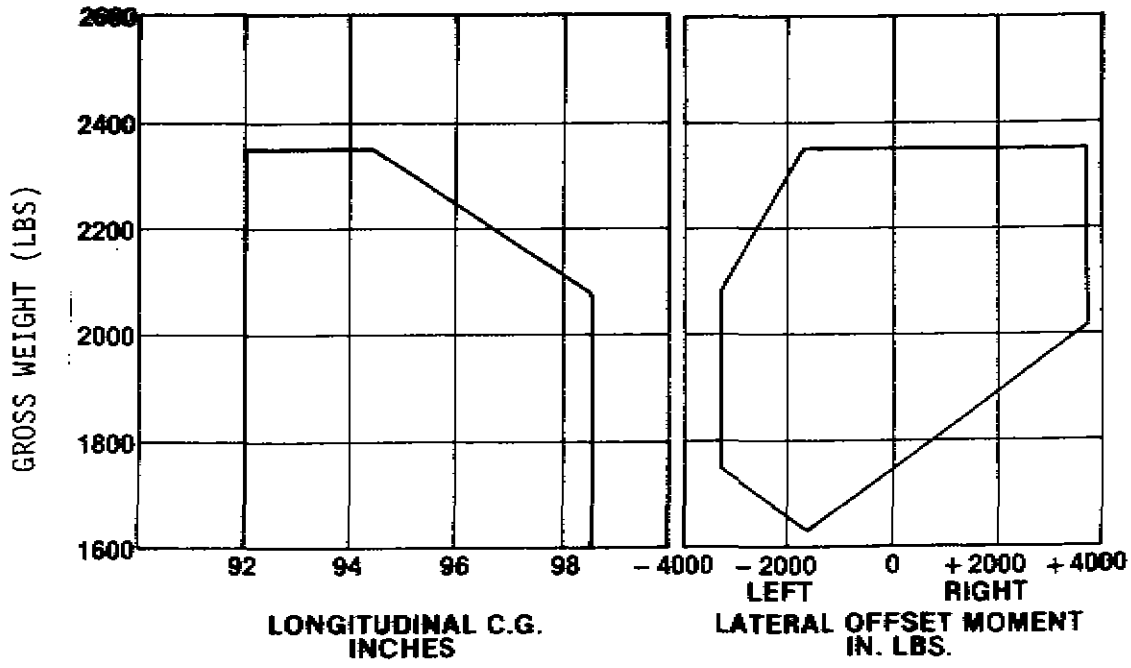


Figure 10.8.3

REVISIONS:

Issued: 11/20/81
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SUPPLEMENT 9

(RESERVED)

REVISIONS:

Issued: 12/31/80
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SUPPLEMENT 10

(RESERVED)

FAA Approved: March 28, 2017

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SUPPLEMENT 11
AUXILIARY FUEL TANK

SECTION 1 - GENERAL

I. INTRODUCTION

This supplement must be attached to the Basic Flight Manual when the aircraft is equipped with an Enstrom Auxiliary Fuel Tank Kit No. 28-01009. Operation must be in compliance with the Basic Flight Manual except as modified by this supplement. Other approved sections and supplements to this Flight Manual are recommended procedures.

II. DESCRIPTION

The auxiliary fuel tank is a 13-gallon tank with 12.7 gallons of usable fuel and .3 gallons of unusable fuel. It consists of a foam-filled, neoprene bladder inside an aluminum case. It is installed in the baggage box with a line running to the main fuel tanks. The auxiliary fuel tank is equipped with a 12-volt electric pump which is used to transfer the fuel from the auxiliary tank to the main tanks. The auxiliary fuel tank is designed to be quickly installed and removed.

Fuel transfer is controlled by a switch on the lower left switch panel. Turning the switch on transfers the fuel from the auxiliary tank to the main tanks. An indicator light near the fuel transfer switch will illuminate when all of the fuel in the auxiliary fuel tank has been transferred to the main tanks. The fuel must be in the main tanks to supply the engine. This system is not designed to run the engine directly from the auxiliary fuel tanks. The fuel transfer rate is approximately 25 gallons per hour, and takes approximately one-half hour to complete.

Because certain passenger load/fuel load combinations may move the center of gravity outside of the approved envelope, provisions have been included for storage of the ground handling wheels in a forward internal location. In addition to allowing a greater variety of loading, the internal storage of the ground handling wheels should increase the cruise speed by approximately 2%. The wheels have been designed to mount immediately ahead of the instrument console.

III. SUITABILITY FOR INSTALLATION

This installation can only be made on 280C and 280F helicopters with normal gross weights of 2350 lbs or above and 108 lb capacity baggage compartments.

REVISIONS:

Issued: 9/23/83
Revised: 1/30/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 2 - OPERATING LIMITATIONS

I. TYPE OF OPERATIONS - See Basic Rotorcraft Flight Manual

II. AIRSPEED LIMITATIONS - See Basic Rotorcraft Flight Manual

III. ALTITUDE LIMITATIONS - See Basic Rotorcraft Flight Manual

IV. WEIGHT AND BALANCE - See Basic Rotorcraft Flight Manual

V. PLACARDS

The following placards must be attached as described when the auxiliary fuel tank is installed in the aircraft:

A. On the auxiliary fuel tank near the filler cap:
(Placard P/N's 28-12433-1 & 28-22565-11)

"FUEL 100/130 OCT"

and

"13 GAL"

B. On the instrument panel below the transfer switch:
(Placard P/N 28-22560-11)

"TRANSFER FUEL BELOW 180 LBS"

C. On the instrument panel below the transfer complete indicator light:
(Placard P/N 28-22559-13)

"AUX FUEL EMPTY"

REVISIONS:

FAA Approved: 9/23/83
Revised: 7/1/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES

I. ENGINE FAILURE

A. Follow the procedures in Section 3 of the Basic Flight Manual.

B. If time permits and a forced landing is imminent: Auxiliary Fuel Transfer Switch - OFF.

II. DITCHING WITH POWER

A. Auxiliary Fuel Transfer Switch - OFF.

B. Follow the procedures in Section 3 of the Basic Flight Manual.

III. FIRE IN FLIGHT

A. Auxiliary Fuel Transfer Switch - OFF.

B. Follow the procedures in Section 3 of the Basic Flight Manual.

REVISIONS:

FAA Approved: 9/23/83
Revised: 7/1/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 4 - NORMAL PROCEDURES

I. FUELING

A. Use only 100/130 or 100LL avgas.

B. After securing the filler cap, make sure the area around the filler is dry. If any fuel has spilled, it must be cleaned up.

C. Ventilate the baggage box thoroughly after refueling.

II. PREFLIGHT INSPECTION

The following items are added to the preflight inspection as described in Section 4 of the Basic Flight Manual:

A. Baggage Box

1. Check security of fuel tank and transfer pump.

2. Check fuel quantity and fuel tank cap security.

3. Check fuel lines for leaks.

4. Drain fuel sample into jar and check fuel grade, and check for impurities.

III. BEFORE STARTING ENGINE

A. Transfer Pump - OFF.

B. Complete Prestart Check List as described in Section 4 of the Basic Flight Manual.

IV. FUEL TRANSFER

A. When the fuel quantity in the main tanks reaches approximately 180 lbs, turn Fuel Transfer Switch ON.

B. When the "Aux Fuel Empty" indicator illuminates, turn Fuel Transfer Switch OFF.

NOTE: If there is insufficient room in the main tanks to hold the fuel transferred from the auxiliary tank, the excess fuel will be dumped overboard through the fuel tank vents.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

V. TRIM

Because use of the auxiliary fuel tank will tend to move the center of gravity toward the aft limit, it may be desirable to increase the forward cyclic trim authority. This may be accomplished by readjusting the longitudinal bias spring under the right hand seat. Refer to Maintenance Manual, Cyclic Trim Rigging Procedure, MM-22-7.

VI. INTERNAL GROUND HANDLING WHEEL STORAGE

A. After the wheels have been raised and the helicopter is on its skids, remove the latch pins on the inboard end of the axle by pulling upward.

B. Remove the washer on the inboard end of the axle and remove the wheel from the skid by pulling outward.

C. Replace the washer and latch pin on the axle.

D. Remove a handle from the wheel bracket on the instrument console and slide this handle through the center of the wheel, from the outside of the wheel inward.

E. Slide the handle into the bracket and turn the handle until it slides into the detent in the tube. Then, while still pushing, turn the handle approximately one-quarter turn clockwise to lock.

F. Check to assure that the handle is locked in place. The spring on the side of the bracket should also be slightly compressed.

G. Repeat steps A-F with the remaining wheel.

H. To remove the handles from the bracket, push inward and turn the handle counterclockwise until it stops, approximately one-quarter turn, then pull straight out on the handle.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 5 - PERFORMANCE

There is no change to the performance section of the Basic Flight Manual. Internal stowage of the ground handling wheels should yield approximately a 2% increase in cruise speed for a given power setting. All limitations listed in the Basic Flight Manual remain in effect for this configuration.

REVISIONS:

FAA Approved: 9/23/83
Revised: 7/1/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SECTION 6 - WEIGHT AND BALANCE

I. When an Enstrom auxiliary fuel tank kit No. 28-01009 is installed, a new weight and balance should be computed as described in Section 6 of the Basic Rotorcraft Flight Manual, incorporating the following information:

Item	Weight	Arm	Moment
Fixed lines and provisions	2.3	79.1	182.0
Auxiliary fuel tank	20.3	135.0	2740.5
Unusable fuel in auxiliary tank	2.0	135.0	270.0
	24.6		3192.4

II. CENTER OF GRAVITY LIMITS - See Basic Rotorcraft Flight Manual

Note that the typical data points shown use 170 lbs as the minimum weight pilot. Certain solo lightweight pilot configurations may require additional ballast in the cockpit to remain within the approved c.g. envelope.

Typical Load Condition:

Item	Weight	C.G.	Moment
Basic aircraft	1620	100.5	162,810
Auxiliary fuel tank with unusable fuel	25		3,192
	1645	100.91	166,022
Pilot and passenger	388	62.0	24,056
Full fuel	240	96.0	23,040
Auxiliary fuel	74	135.0	9,990
	2347	95.05	223,088
Relocate ground handling wheels	- 12	104.7	- 1,256
	+ 12	16.6	+ 199
			- 1,057
Stow wheel bar	3	52.5	+ 157
Wheels relocated	2350	94.55	222,188

REVISIONS:

Issued: 9/23/83
Revised: 7/1/84

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.

UNCONTROLLED COPY WHEN DOWNLOADED OR PRINTED

SUPPLEMENT NO. 12

ENGINE EXHAUST MUFFLER

SECTION 1 - GENERAL

I. INTRODUCTION

This supplement must be attached to the basic flight manual when the aircraft is equipped with a Wall-Colmonoy P/N ENX-0001 or an Enstrom P/N 28-12577-1 muffler. Operation in compliance with the basic rotorcraft flight Manual is mandatory except as modified by this supplement. Other approved sections and supplemental data are recommended procedures.

II. DESCRIPTION

The muffler is installed in place of the standard exhaust tailpipe. No further modification to the aircraft is necessary. The muffler is one pound heavier than the tailpipe which it replaces.

SECTION 2 – OPERATING LIMITATIONS

No change from the basic flight manual.

SECTION 3 – EMERGENCY AND MALFUNCTION PROCEDURES

No change from the basic flight manual.

SECTION 4 – NORMAL PROCEDURES

No change from the basic flight manual.

SECTION 5 – PERFORMANCE

The slight increase in exhaust back pressure at high power settings reduces the engine power output such that the maximum hover weight must be reduced 60 pounds from that shown in Figures 5.3 and 5.4. The engine limits remain at 39.0 inches-Hg MP and 3050 RPM.

SECTION 6 – WEIGHT AND BALANCE

No change from the basic flight manual.

Visit www.enstromhelicopter.com for instructions to order an original manual and to register for email notification of updates.