



LUFTFARTSVERKET
Swedish Civil Aviation Administration

MODIFICATION CERTIFICATE

No. M 18/96 Rev. 2

This certificate issued to

Labro Komponent AB

certifies that the modified type design of the product stated below meets the airworthiness requirements of the Swedish Civil Aviation Regulations (BCL).

Product	Piper PA-28-161, Warrior II
Modification	Installation of Hoffmann propeller HO 4/23 HM-170 130 to 135 ITP and Liese V76-L muffler or Hoffmann propeller HO 4/23 HM-170 130 to 135 ITP
Application	Labro Komponent AB, Kungsgatan 67, 632 21 Eskilstuna by letter dated 1999-02-16 (L1999-0417-1041)
Type Design	LBA Kennblatt Geräte-Nr. 32.110/11
Limitations	According to AFM Supplement No. S 18/96, Rev. 1 (Pitch 130 to 133) and S 20/00 (Pitch 135), established by the applicant
Approval References	Granskningsrapport No. M 18/96, Rev. 3. The Modification Certificate No M 18/96 was first issued 29 May 1998.

This approval is not valid for an aircraft of this model on which other previously approved modifications are incorporated unless it is determined by the installer that the interrelationship between this change and any of those other previously approved modifications will introduce no adverse effect upon the airworthiness of the aircraft.

Norrköping 12 April 2000

LUFTFARTSVERKET
Aviation Safety Department

Eskil Wiklund

Staffan Jönsson

LABRO KOMPLEMENT AB
KUNGSGATAN 67
S-632 21 ESKILSTUNA
SWEDEN

AFM Supplement No. S 20/00

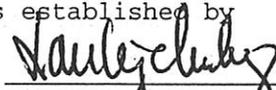
LFV approved supplement
to the
FAA approved airplane flight manual
for
Piper Aircraft Corp. Model:
PA-28-161

REGISTRATION NO: SE-KEI

SERIAL NO: 2816072

This supplement must be attached to the FAA Approved Airplane Flight Manual dated 1982, August 13 when the airplane is modified by the installation of a HOFFMANN 4-blade propeller HO 4/23 HM 170 with a pitch of 135 in accordance with Modification Certificate No. M 18/96 Rev 2 and a supplemental muffler from LIESE FLUGTECHNIK, type LIESE-V76-L meeting the requirements of Type Acceptance Certificate No. 114/96. (optional)
The information contained herein supplements or supersedes the information of the basic Airplane Flight Manual only in those areas listed herein. For limitations, procedures and performance information not contained in the supplement consult the basic FAA Approved Airplane Flight Manual.

This AFM Supplement is established by


LARS HJELMBERG
for Labro Komponent AB.

LFV APPROVED: 

ESKIL WIKLUND

Head Aircraft Engineering Office
Swedish Civil Aviation Administration
Norrköping Sweden

Date: 7 April 2000

Page 1 of 10 + 5 figures

LABRO KOMPLEMENT AB
KUNGSGATAN 67
S-632 21 ESKILSTUNA
SWEDEN

AFM SUPPLEMENT NO.
S 20/00 FOR PIPER
AIRCRAFT CORP
MODEL: PA-28-161

LOG OF REVISIONS TO SUPPLEMENT

Supplement Revision -Number	Revised Pages	Description Revision	LFV Approved	Date
IR		Initial Release		00Mar27

LABRO KOMPLEMENT AB
KUNGSATAN 67
S-632 21 ESKILSTUNA
SWEDEN

AFM SUPPLEMENT NO.
S 20/00 FOR PIPER
AIRCRAFT CORP
MODEL: PA-28-161

TABLE OF CONTENTS

SECTION	TITLE	PAGE	AFM PAGE
1	GENERAL	4	1-3
2	LIMITATIONS	4	2-3, 2-10 (new page)
3	EMERGENCY PRODEDURES	6	-
4	NORMAL PROCEDURES	6	4-5, 4-14, 4-20 4-21, 4-22
5	PERFORMANCE	7	5-14, 5-15, 5-16, 5-17, 5-18
6	WEIGHT AND BALANCE	8	6-2
7	DESCRIPTION & OPERATION	8	7-2, 7-6
8	AIRPLANE HANDLING, SERVICING & MAINTENANCE	8	8-8, 8-10
9	OPERATING TIPS	9	10-2

LABRO KOMPLEMENT AB
KUNGSGATAN 67
S-632 21 ESKILSTUNA
SWEDEN

AFM SUPPLEMENT NO.
S 20/00 FOR PIPER
AIRCRAFT CORP
MODEL: PA-28-161

SECTION 1 GENERAL

1.3 Engines

k) Supplemental muffler LIESE-V76-L

1.5 Propellers

b) Propeller Manufacturer Hoffmann
c) Model HO 4/23 HM
d) Number of Blades 4
e) Propeller
 (1) Maximum Diameter 170 cm
 (2) Minimum Diameter 170 cm
 (3) Maximum Pitch at 0.75 R 135 cm
 (4) Minimum Pitch at 0.75 R 135 cm

SECTION 2 LIMITATIONS

2.7 Power plant limitations

i) Propeller Manufacturer Hoffmann
j) Propeller Model HO 4/23 HM
k) Propeller
 Minimum Diameter 170 cm.
 Maximum Diameter 170 cm
 Minimum Pitch at 0.75 R 135 cm
 Maximum Pitch at 0.75 R 135 cm
l) Propeller Tolerance (static RPM
 at maximum permissible throttle
 setting) Not above 2250 RPM
 Not below 2100 RPM

2.25 Placards

In full view of the pilot:

For better engine performance during
en route climb fly >/ 95 KIAS and/or 2450-2500 RPM.

LABRO KOMPLEMENT AB
KUNGSGATAN 67
S-632 21 ESKILSTUNA
SWEDEN

AFM SUPPLEMENT NO.
S 20/00 FOR PIPER
AIRCRAFT CORP
MODEL: PA-28-161

On the pilot,s sun visor: (extract from Labro performance figure 5:15B)

CRUISE RPM-SETTINGS

HOFFMANN HO 4/23 HM 170/135 PIPER PA-28-161

Altitude (feet)	PERCENT POWER					STD temp. (degr. C.)
	55%	60%	65%	70%	75%	
1000 2140	2250	2300	2370	2440	+13	
2000 2160	2260	2330	2380	2450	+11	
3000 2170	2280	2340	2400	2470	+ 9	
4000 2190	2290	2350	2420	2480	+ 7	
5000 2210	2300	2370	2450	2510	+ 5	
6000 2220	2310	2390	2470	2520	+ 3	
7000 2230	2320	2400	2480	2540	+ 1	
8000 2240	2350	2430	2500	2570	- 1	
9000 2250	2360	2450	2510	2580	- 3	
10K 2290	2420	2460	2550	2600	- 5	
11K 2320	2430	2490	2560	2610	- 7	
12K 2330	2440	2510	2570	--	- 9	

The template shall be modified by 1 % for every 6 degr C difference to standard temperature. Increase RPM when warmer, decrease when cooler for the given % engine power.

WARNING: DO NOT LEAN ABOVE 75 % ENGINE POWER.

WARNING: A GIVEN RPM DURING CLIMB ALWAYS GIVES A HIGHER PERCENTAGE ENGINE POWER THAN DURING CRUISE.

LABRO KOMPLEMENT AB
KUNGSATAN 67
S-632 21 ESKILSTUNA
SWEDEN

AFM SUPPLEMENT NO.
S 20/00 FOR PIPER
AIRCRAFT CORP
MODEL: PA-28-161

SECTION 3 EMERGENCY PROCEDURES

No changes.

SECTION 4 NORMAL PROCEDURES

4:5 Normal Procedures Check List, Preflight Check, Nose section.

Supplemental muffler incl. clips...check for external damages and cracks.
check attachment to exhaust pipes.

4:9 Preflight Check, Nose section.

Verify that the supplemental muffler is tightly attached to the exhaust pipes.
Visually inspect the supplemental muffler and its clips to be free from external damages and cracks.

4:23 Takeoff

For better takeoff performance set maximum RPM and wait approx. 10 seconds allowing RPM to stabilize before commencing ground roll.

Proper aircraft speed is necessary to obtain sufficient propeller RPM generating adequate thrust.

Do not attempt to lift off before continuous adequate acceleration up to proper climb speed can be obtained.

Do not lift off and fly on "ground effect" - aircraft may not be able to generate sufficient acceleration to obtain proper speed.

Aircraft may not be able to obtain a continuous adequate acceleration and will not follow published paved level, dry runway takeoff performance data if for example soft surface or uphill runways are used and/or if runway surface is wet, consists of wet/ high-cut grass, snow and/or any other runway surface obstacles.

LABRO KOMPLEMENT AB
KUNGSGATAN 67
S-632 21 ESKILSTUNA
SWEDEN

AFM SUPPLEMENT NO.
S 20/00 FOR PIPER
AIRCRAFT CORP
MODEL: PA-28-161

4:25 Climb

For better engine performance during en route climb, fly at or above 95 KIAS and/or 2450-2500 RPM.

4:27 Cruising

The simplified leaning procedure as described in passage 5 shall not be practiced.

Caution: Above 9,000 feet engine is capable of generating more than 75 % rated power.

SECTION 5 PERFORMANCE

Piper Aircraft Corporation figures 5:7, 5:9, 5:11 and 5:13 - Takeoff ground roll/performance and Takeoff distance over 50 ft barrier.

Do not use - cross over.

Use instead Labro Komponent AB figures 5:7B, 5:9B, 5:11B and 5:13B.

(Data obtained with the aircraft equipped with flap/aileron gap seals, flap hinge/fuel tank rivets fairings from Laminar Flow Systems, supplemental muffler Liese-V76-L from Liese and propeller HO 4/23 HM 170 - 135 from Hoffmann).

Piper Aircraft Corporation figure 5:15 - Engine performance.

Do not use - cross over.

Use instead Labro Komponent figure 5:15B.

(Data obtained with the aircraft equipped with flap/aileron gap seals, flap hinge/fuel tank rivets fairings from Laminar Flow Systems, supplemental muffler Liese-V76-L from Liese and propeller HO 4/23 HM 170 - 135 from Hoffmann).

LABRO KOMPLEMENT AB
KUNGSGATAN 67
S-632 21 ESKILSTUNA
SWEDEN

AFM SUPPLEMENT NO.
S 20/00 FOR PIPER
AIRCRAFT CORP
MODEL: PA-28-161

SECTION 6 WEIGHT & BALANCE

6.1 General

The propeller (incl. spinner doome and bulkhead) is approx 5.0 Kg lighter than the standard Sensenich propeller incl. accessories.

The supplemental muffler LIESE-V76-L attached to the exhaust pipes increases the weight by 0.9 Kg at station 0.4 meter.

SECTION 7 DESCRIPTION & OPERATION OF THE AIRPLANE

7.5 Engine & Propeller

Cross over passage 6

See manual from propeller manufacturer.

7.11 Engine controls.

For the convenient setting of proper engine RPM speed versus rated power, an extract of Labro Komponent Performance figure 5:15B is attached to the pilot,s sun-visor.

SECTION 8 AIRPLANE HANDLING, SERVICING & MAINTENANCE

8.12 Supplemental engine muffler (new paragraph)

There is a possibility that metal parts may separate from the original exhaust system and follow the exhaust stream. With the LIESE-V76-L supplemental muffler installed these parts might be collected in this muffler. For this reason perform the following at every 50 hours inspection:

1. Dismantle the LIESE muffler by removing its clips.
2. Visually inspect the interior of the LIESE muffler to be free from foreign and loose parts.
3. Visually inspect the entire LIESE muffler and its clips to be free from deformation, external damage and cracks.

LABRO KOMPLEMENT AB
KUNGSATAN 67
S-632 21 ESKILSTUNA
SWEDEN

AFM SUPPLEMENT NO.
S 20/00 FOR PIPER
AIRCRAFT CORP
MODEL: PA-28-161

The lengthwise cutted muffle tubes shall not be bent into or against the direction of the exhaust.

In all cases of damage of the LIESE muffler it shall be forwarded to

Firma BITZ FLUGZEUGBAU GmbH
Ullrichsmadh 22-30
D-861 79 AUGSBURG
GERMANY

4. Mount the empty and undamaged LIESE muffler to the exhaust pipes and verify its tightly attachment by the undamaged clips.

Information about observed damages to the LIESE mufflersystem which could have an impact on aviation safety shall immediately be forwarded to the Civil Aviation Authority and the producer:

Firma Hermann LIESE FLUGTECHNIK
TRUDINGERSTRASSE 2
D-82008 UNTERHACHING
GERMANY
TEL/FAX int+49-89-6113249.

8.17 Propeller service

See manual from propeller manufacturer.

SECTION 10 OPERATING TIPS

- 10.4 Noted changes with 4-blade propeller and muffler.
(new paragraph)

Data collected for this Modification Certificate have been obtained with the aircraft equipped with flap / aileron gap seals, flap hinge/ fuel tank rivets fairings from Laminar Flow System.

The following changes may among others be noted with the exchange to the 4-blade propeller with muffler:

an extra "RAM-effect" may boost aircraft effectiveness.

LABRO KOMPONENT AB
KUNGSATAN 67
S-632 21 ESKILSTUNA
SWEDEN

AFM SUPPLEMENT NO.
S 20/00 FOR PIPER
AIRCRAFT CORP
MODEL: PA-28-161

the lower max static RPM may give longer ground roll
at take off,

the aircraft may fly with max RPM at lower speeds
than indicated in the AFM,

during climb, engine performance may improve by
increased climb speed and/or increased engine RPM,

the cooling of the cylinder heads may be more
efficient,

there is less risk of RPM overspeeding at level
flight with maximum throttle and during descend,

the overall noise level from the aircraft is
lowered.

END

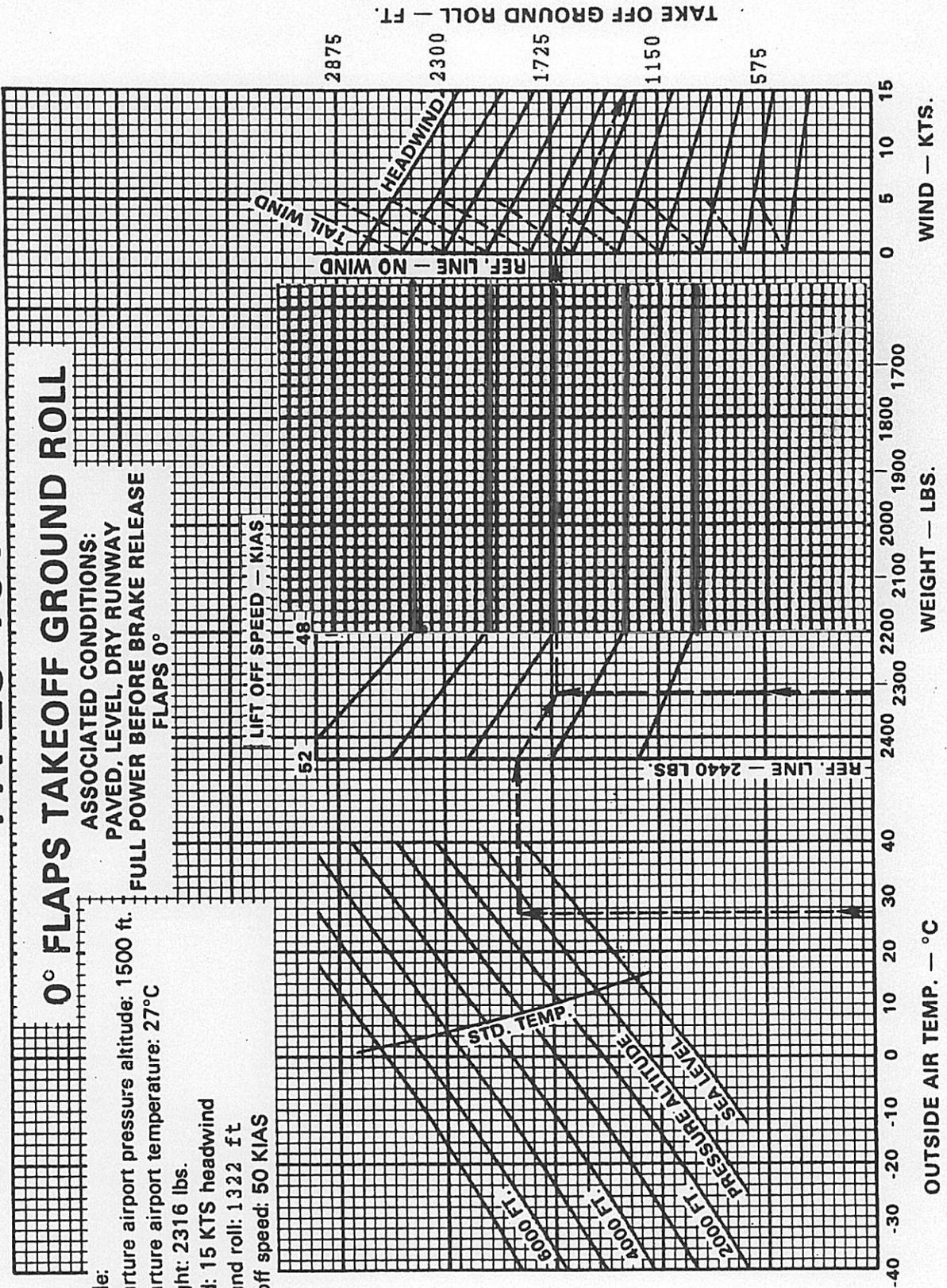
HOFFMANN HO/23 HM 170/135 PROPELLER MOUNTED

PA-28-161

0° FLAPS TAKEOFF GROUND ROLL

ASSOCIATED CONDITIONS:
PAVED, LEVEL, DRY RUNWAY
FULL POWER BEFORE BRAKE RELEASE
FLAPS 0°

Example:
Departure airport pressure altitude: 1500 ft.
Departure airport temperature: 27°C
Weight: 2316 lbs.
Wind: 15 KTS headwind
Ground roll: 1322 ft
Lift-off speed: 50 KIAS



0° FLAPS TAKEOFF GROUND ROLL
Figure 5-7 :B

HOFFMANN HO/23 HM 170/135 PROPELLER MOUNTED

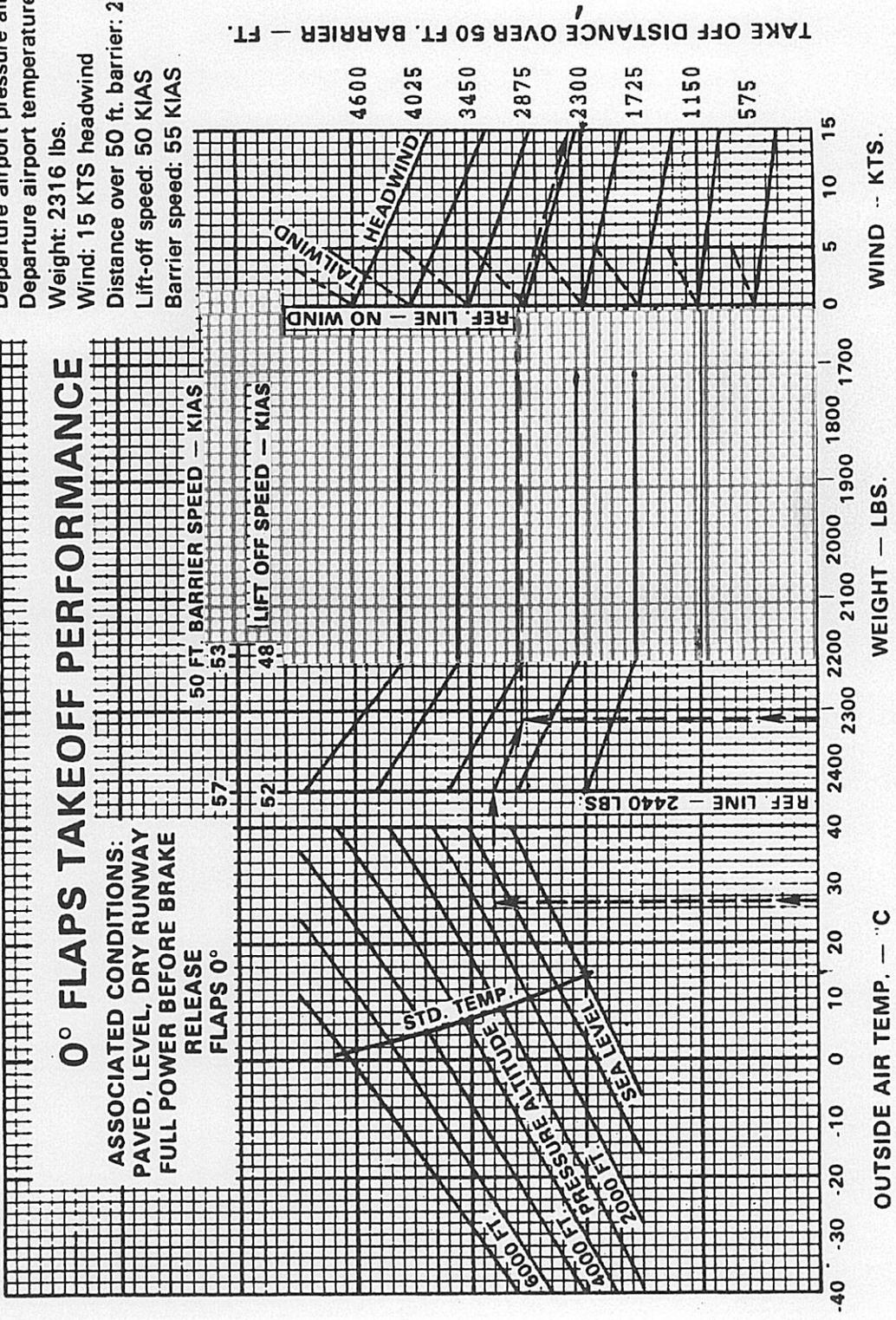
flap/aileron gap seals installed. **PA-28-161**

Example:

Departure airport pressure altitude: 1500 ft.
 Departure airport temperature: 27°C
 Weight: 2316 lbs.
 Wind: 15 KTS headwind
 Distance over 50 ft. barrier: 2415 ft
 Lift-off speed: 50 KIAS
 Barrier speed: 55 KIAS

0° FLAPS TAKEOFF PERFORMANCE

ASSOCIATED CONDITIONS:
 PAVED, LEVEL, DRY RUNWAY
 FULL POWER BEFORE BRAKE
 RELEASE
 FLAPS 0°



0° FLAPS TAKEOFF PERFORMANCE

Figure 5-9 :B

ISSUED:

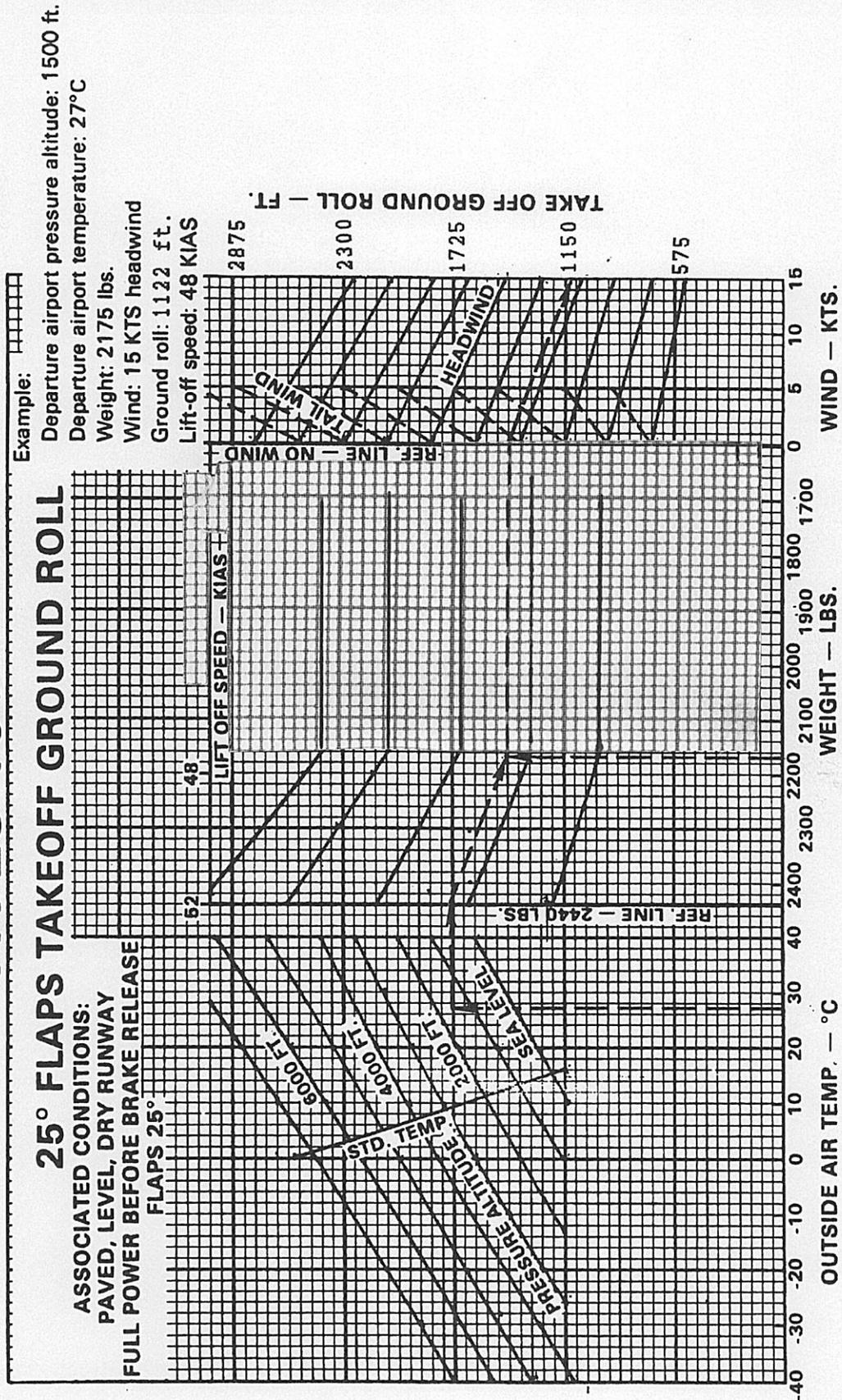
MARCH 27 2000

**SECTION 5
PERFORMANCE**

LABRO KOMPLEMENT AB
PA-28-161, WARRIOR II

HOFFMANN HO/23 HM 170/135 PROPELLER MOUNTED

PA-28-161



25° FLAPS TAKEOFF GROUND ROLL
Figure 5-11 :B

HOFFMANN HO/23 HM 170/135 PROPELLER MOUNTED

PA-28-161

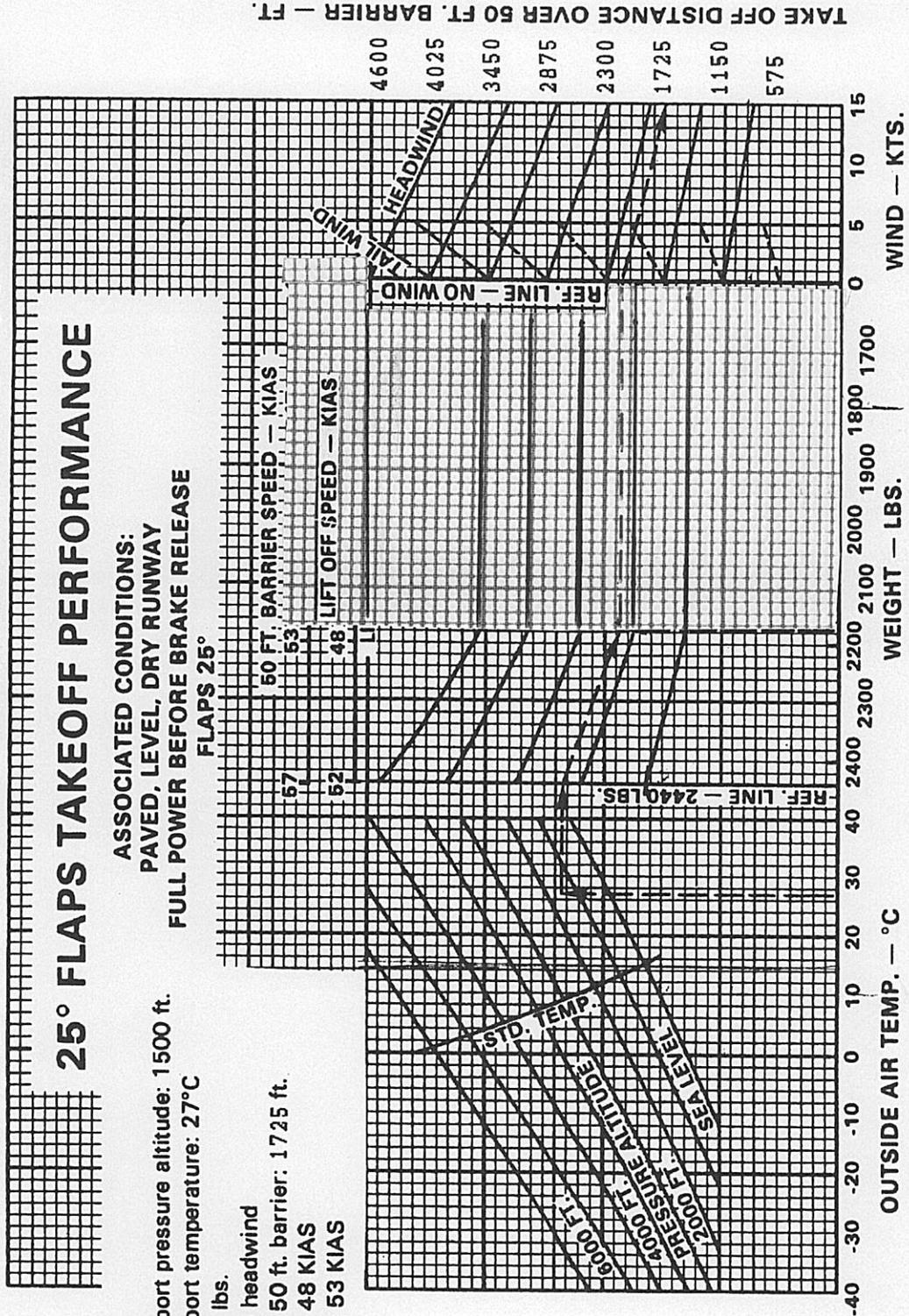
flap/aileron gap seals installed.

25° FLAPS TAKEOFF PERFORMANCE

ASSOCIATED CONDITIONS:

PAVED, LEVEL, DRY RUNWAY
 FULL POWER BEFORE BRAKE RELEASE

Example:
 Departure airport pressure altitude: 1500 ft.
 Departure airport temperature: 27°C
 Weight: 2175 lbs.
 Wind: 15 KTS headwind
 Distance over 50 ft. barrier: 1725 ft.
 Lift-off speed: 48 KIAS
 Barrier speed: 53 KIAS



25° FLAPS TAKEOFF PERFORMANCE

Figure 5-13 :B

**SECTION 5
PERFORMANCE**

LABRO KOMPLEMENT AB

PA-28-161, WARRIOR II

HOFFMANN HO/23 HM 170/1 PROPELL MOUNTED

PA-28-161

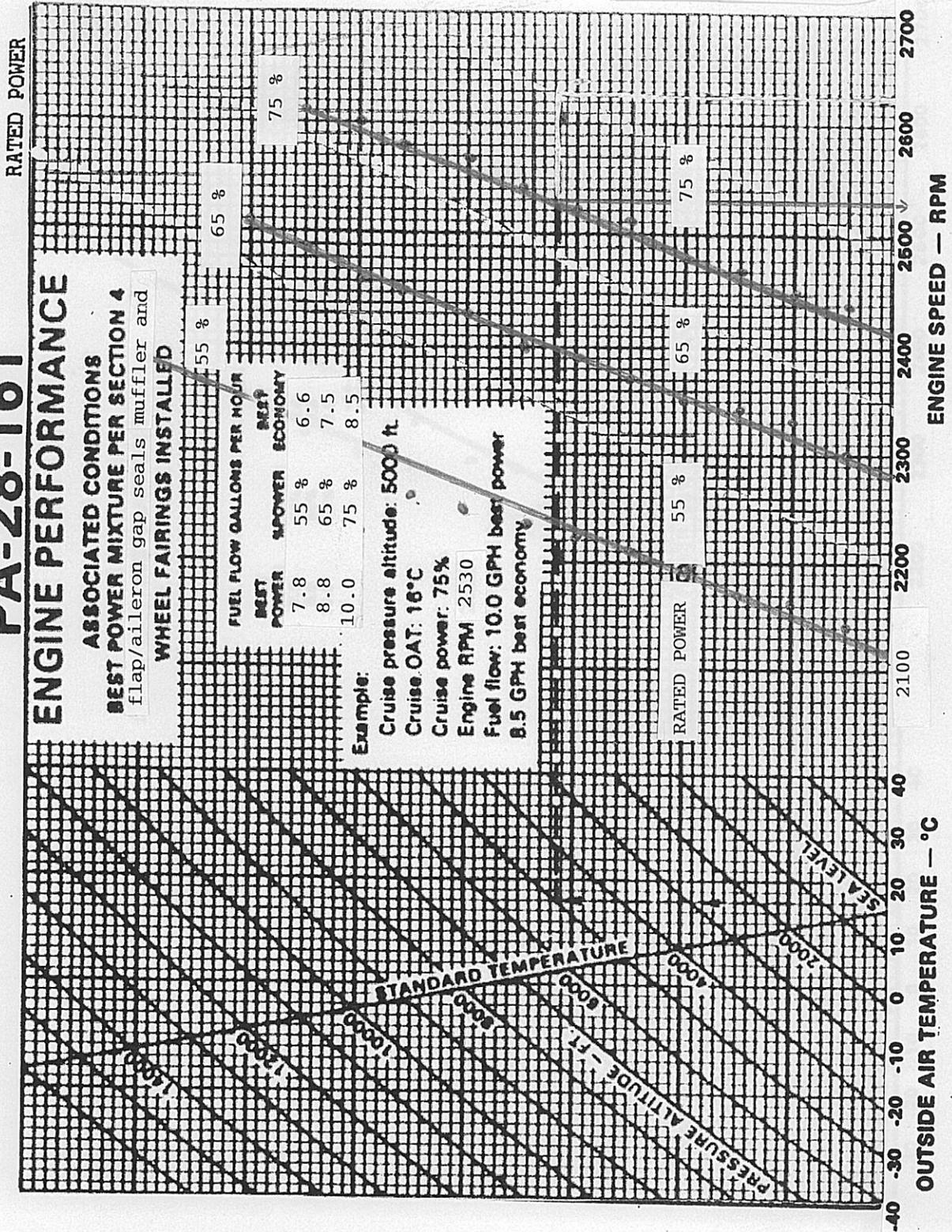
ENGINE PERFORMANCE

ASSOCIATED CONDITIONS
BEST POWER MIXTURE PER SECTION 4
flap/aileron gap seals muffler and
WHEEL FAIRINGS INSTALLED

FUEL FLOW GALLONS PER HOUR		
BEST POWER	BEST ECONOMY	
7.8	55 %	6.6
8.8	65 %	7.5
10.0	75 %	8.5

Example:

- Cruise pressure altitude: 5000 ft.
- Cruise OAT: 16°C
- Cruise power: 75%
- Engine RPM: 2530
- Fuel flow: 10.0 GPH best power
8.5 GPH best economy



ENGINE PERFORMANCE

Figure 5-15 :B

ISSUED:
REVISED:

MARCH 27 2000