PROM$^{\dot{G}}$ Flight Calculator

630H User's Guide

Bell 407/206B/L Helicopters

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Description

The 630H system performs a number of calculations useful in preflight planning.

The Weight & Balance Program computes gross weight and both the longitudinal and lateral total moments and CG's (center of gravity). The program stores the entire CG envelope and indicates whether the computed CG's fall within the envelope. The program will indicate if the computed CG's are close to either the forward or aft limit.

The station arms as published in typical flight manuals are stored in the program. The user can change any or all of the arms to suit a particular aircraft. Similarly, the maximum gross weight, empty weight and arm, and default weights can be modified by the user to suit a particular aircraft.

The Density Altitude Program computes the density altitude from the entered indicated altitude, altimeter setting, and outside air temperature.

The True Air Speed Program computes the true airspeed corrected for density altitude.

The Great Circle Distance Program computes the distance and initial magnetic heading between any two points. The points are defined by their latitude and longitude.

The Estimated Time Enroute Program simply calculates the time from the entered distance and airspeed. The answer is expressed in hours and minutes.

The Setup Routine is used to select an aircraft for the weight-&-balance program and to check and/or modify the station arms and default weights.

In response to a prompt, enter a value and push [ENTER]. Incorrect entries may be cleared by pressing the red [C.CE] key unless you have already pushed [ENTER], in which case you should use the [BACKUP] key (see Template Layout below for location). Of course, you can also start over by running the routine again. The Weight-&-Balance Program has a rework key which allows you to start over without erasing the previous entries.

Keyboard TEMPLATE

The eight function keys on the face of the calculator are used to run various programs which are identified by the template to be placed on the calculator. The function keys are identified as follows:

Rework	Den Alt	Dist	Backup
W&B	TAS	ETE	Setup

Weight & Balance - [W&B] and [Rework] Function Keys

The calculator must be set up by the user for the particular aircraft he or she wishes to use. The message "NEEDS SETUP" will appear if you attempt to run this routine without completing the setup routine.

Use the [W&B] key to start the routine for a new problem. This sets the prompted weights at the default values entered in the setup routine. To rework a loading problem, you can use either the [BACKUP] key to proceed backwards through the computed results and the prompts or the [REWORK] key to start over without clearing any of the weights.

Prompt	**User Response**
	Push the [Rework] or [W&B] key to start this routine.
Xxxxxx?_	The currently configured aircraft type and serial number will appear. Push [Yes] to confirm that this is correct.

Weights below are in pounds, except for fuel, which is in gallons.

PILOT xxx?_	Enter the weight for the pilot.
COPILOT xxx?_	Enter the weight for the copilot.
RGT PX xxx?_	Enter the weight for the right rear passenger.
CTR PX xxx?_	Enter the weight for the center rear passenger.
LFT PX xxx?_	Enter the weight for the left rear passenger.
CARGO xxx?_	Enter the weight in the baggage compartment.
OIL/LB xx.x?_	If the weight of oil shown is correct, push [ENTER], otherwise enter the correct weight.
JP-5/G xx?_	Enter the amount of fuel (in gallons or pounds).[1]

The calculator will pause for a moment to make the calculations and then will display the gross weight and the amount by which the computed weight is over or under the maximum gross weight. Push [ENTER] to proceed forward or [BACKUP] to proceed backward in the output list.

WT: xxxx -xxx	The computed gross weight and amount by which it is less than ("-" sign) or greater than ("+" sign) the maximum.
FWD DRS ON N/Y?_[2]	Push [YES} if the forward doors are on the aircraft.

[1] JP-4 fuel can also be used. Fuel can be entered in gallons or pounds. See Select Fuel Type & Unit – Setup Code 6865 on page 13.

CG: xxx.x AA[3]	The computed longitudinal CG (center of gravity) with the fuel quantities entered above. "AA" indicates any of several messages.
ENV: fff.f –aaa.a	The longitudinal CG Envelope forward (fff.f) and aft (aaa.a) limits for the computed gross weight. "fff.f" and "aaa.a" will appear as 0's if the aircraft is significantly over gross and the "FWD>AFT" message appeared with the computed CG.
LACG: xxx.x AA[3]	The computed lateral CG. "AA" represents any of several messages.
LENV: -l.ll +r.rr	The lateral CG Envelope left (l.ll) and right (r.rr) limits for the computed gross weight.

For some aircraft, additional CG computations are made at critical and most forward CG's, and at the most aft CG. See Fuel Tables for details.

LDG FUEL xx?_	Enter the amount of fuel at landing.
CG-LD: xxx.x AA[3] ENL: fff.f-aaa.a	The longitudinal CG and envelope forward and aft limits are shown with the landing fuel.

WARNING: These messages are based on the permanently installed CG envelope for the type aircraft selected. The user must check the CG limit calculations at various gross weights for each aircraft type to confirm that they are correct.

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[2] This prompt appears only for the 206B Series aircraft. There are two different CG Envelopes for the 206B: one for use with the front doors on, and the other for use with the front doors off. Answering Yes or No to this prompt does NOT adjust the empty weight or empty arms.

[3] The following messages can appear with the computed CGs:

OK	CG is within envelope.
^GROSS	The aircraft is over its maximum gross weight.
=FWD^ =LFT^	The CG is either equal to or close to the forward or left limit. If followed by the "^", the aircraft is over maximum gross weight.
>FWD^ >LFT^	The CG is too far forward or left. If followed by the "^", the aircraft is over the maximum gross weight.
=AFT^ =RGT^	The CG is either equal to or close to the aft or right limit. If followed by the "^", the aircraft is over the maximum gross weight.
>AFT^ >RGT^	The CG is too far aft or right. If followed by the "^", the aircraft is over the maximum gross weight.
FWD>AFT LFT>RGT	The forward limit of the envelope is aft of the rear limit or the left limit of the lateral envelope is right of the right limit (these situations can occur when the aircraft is significantly over gross weight).

Computational Notes

The zero-fuel weight is calculated to the nearest whole pound. Fuel weight is the actual number of gallons entered[4] (including any decimals) times the weight per gallon[5] rounded to the nearest whole pound. Gross weight is the sum of the above two items.

The longitudinal zero-fuel moment is rounded to the nearest inch-pound and the CG rounded to the nearest 1/10th of an inch. The lateral moment is rounded to the nearest 10th of an inch-pound and the CG rounded to the nearest 1/100th of an inch.

For the maximum forward and aft fuel loadings, the calculations are done with the exact amount of fuel (e.g., 39.8 gallons in the case of the forward limit for the 206L-1), however the amount of fuel shown in the calculator display is rounded to the nearest whole gallon because of space limitations. See also Fuel Arm Calculations on page 16

The longitudinal and lateral CG limits are computed from algorithms permanently loaded into the calculator for the type aircraft selected. These cannot be changed by the user. They have been selected from published information by the aircraft maker (usually the Aircraft Flight Manual). The forward limit is rounded up to the next higher 1/10th of an inch and the aft limit is truncated to the lower 1/10th of an inch. The left and right lateral limits are rounded to the nearest 1/100ths of an inch. The envelope limits are shown at the calculated gross weight. These should be checked against those in your Pilot Operating Handbook.

The "close" message ("=FWD", "=LFT", "=AFT", or "=RGT") appears if the computed CG is within 10% of the CG limit computed for a particular weight. For example, if the forward limit is 46.0 inches, the "=FWD" close message will appear if the computed CG is equal to or less than 46.5 inches. Similarly, if the aft limit is 51.0 inches, the "=AFT" close message is displayed if the computed CG is equal to or greater than 50.5 inches.

To assist in testing the program, and in determining the calculated moment arms, you can instruct the program to display all calculated total moments as well as the calculated fuel arms. To do this, push the [Setup] key and enter a code of 90. You will see "SHOW MOMENTS: Y". To turn this feature off, enter the same code again.

The SHOW HOOK option calculates the maximum external load that can be placed on a cargo hook located directly under the mast. The centers of gravities are computed WITHOUT the hook weight. Because the hook is located directly under the mast, any weight applied to it will pull the CGs towards the center of the mast. The max weight is calculated by subtracting the take-off gross weight from the max gross weight including external loads.

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[4] If the option to enter fuel in pounds is selected, the fuel weight entered is adjusted to the nearest whole pound and then converted to gallons (adjusted to the nearest 1/10th of a gallon) using the appropriate weight per gallon for JP-5 or JP-4.

[5] 6.8 pounds per gallon for JP-5 or 6.5 pounds per gallon for JP-4.

Density Altitude Program - [Den Alt] Function Key

This routine computes the density altitude from the entered indicated altitude, altimeter setting, and outside air temperature. The program corrects for pressure altitude readings at other than the standard 29.92 inches.

Prompt	**User Response**
	Push [Den Alt] to start this routine.
DENSITY ALTITUDE	This will appear in the display for a moment.
IND ALT 0?_	Enter the indicated altitude and push [ENTER]. (This must be 35000 or lower.) Enter the indicated altitude and then the current altimeter setting at the next prompt. The program will correct the indicated altitude to obtain the pressure altitude.
ALTIM 29.92?_	If the altimeter is set at 29.92 inches, push [ENTER]; otherwise, enter the altimeter setting.
OAT/C x.x?_[6]	The standard outside air temperature is shown in degrees Celsius for the pressure altitude. If correct, push [ENTER]; otherwise, enter the outside air temperature.
DEN ALT: xxxxx	The computed density altitude is displayed.

```
DENSITY ALTITUDE
IND ALT?    9500
ALTIM?     29.92
OAT/C?     22.00
DEN ALT:   12393
```

Altimeter setting can be entered with or without the decimal point, i.e., 29.92 or 2992.

[6] The temperature shown is the standard temperature for the pressure altitude corrected for the altimeter variation from 29.92 inches. If the actual outside air temperature is above the displayed value, the air is less dense than on a standard day. Conversely, if the actual air temperature is below the displayed value, the air is more dense.

True Air Speed Program - [TAS] Function Key

This routine computes the true air speed from the calibrated air speed corrected for density altitude. The density altitude used is the last one computed by the Density Altitude Program above.

Prompt	**User Response**
	Push the [TAS] key to start this routine.
TRUE AIR SPEED	This will appear in the display for a moment.
KCAS xxx?	If the calibrated air speed shown is correct, push [ENTER]; otherwise, enter the correct calibrated air speed. (The speed shown is from the last time this routine was used.)
KTAS: xxx	The true air speed will appear in the display.

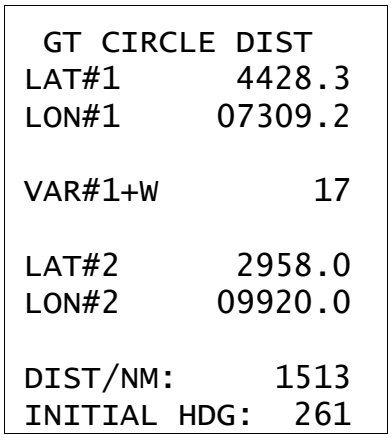
```
TRUE AIR SPEED
KCAS?        140
KTAS:        169
```

Based on most recent density altitude computed.

Great Circle Distance Program - [Dist] Function Key

This routine computes the great circle distance (in nautical miles) between two points defined by their latitude and longitude. It also computes the initial magnetic heading. (On short distances, the heading will be valid for the whole leg, however, as distances increase and the magnetic variation changes, the heading will change.)

Prompt	**User Response**
	Push the [Dist] key to start this routine.
GT CIRCLE DIST	This will appear on the screen for a moment.
LAT#1 0?_	Enter the latitude of the first point. Enter the latitude in the format ddmm.m, e.g., 44 56.3.
LON#1 0?_	Enter the longitude of the first point. Enter the longitude in the format dddmm.m, e.g., 77 23.4.
VAR#1+W 0?_	Enter the magnetic variation of the first point. Enter a westerly variation as a positive number and easterly variation as a negative number.
LAT#2 0?_	Enter the latitude of the second point. This cannot be exactly the same as LAT#1 above.
LON#2 0?_	Enter the longitude of the second point. This cannot be exactly the same as LON#1 above.
DIST/NM: xxxx	The distance in nautical miles is displayed.
INITIAL HDG: xxx	The initial magnetic heading is displayed.



Latitude & longitude of departure

Magnetic variation of departure

Latitude & longitude of destination

Distance in nautical miles

Initial magnetic heading

Estimated Time Enroute/Fuel Required Program - [ETE] Key

This routine computes the estimated time enroute from the entered distance and ground speed. The result is expressed in hours and minutes. It also computes the required fuel based on the entered fuel consumption rate per hour.

Prompt	**User Response**
	Push the [ETE] key to start this routine.
ETE/FUEL REQ	This will appear in the display for a moment.
DIST/NM xx?_	If the distance shown is correct, push [ENTER]; otherwise, enter the correct distance. (The distance shown is the last one computed by the Great Circle Distance program or the last one used in this routine, whichever was later.)
GS/KNOTS xxx?_	If the ground speed shown is correct, push [ENTER]; otherwise, enter the correct ground speed. (The speed shown is the last one computed by the True Air Speed Routine or the last one used in this routine, whichever was later.)
ETE-H:M: hh:mm	The estimated time enroute in hours and minutes is displayed.
FUEL/HR xx?_	Enter the fuel consumption rate in gallons per hour.
INCL 20-MIN RES	This message flashes on the screen for a moment to indicate that the fuel required calculations include a 20-minute reserve at the entered fuel flow rate.
FUEL REQ/G: xxx	The total fuel required is computed.

```
  ETE/FUEL REQ
DIST/NM       735
GS/KNOTS      195
ETE-H:M:     3:49
FUEL/HR        27
INCL 20 MIN RES
FUEL REQ/G:   111
```

Estimated flight time
Fuel burn rate
Estimated fuel required (including a 20-minute reserve of 9 gallons)

Battery Replacement & Maintenance

The batteries are of a long-life lithium type that will operate the calculator for about a year, depending upon how much you use it. The calculator is equipped with an "automatic off" feature that turns the calculator off in about 5 minutes if no keys are operated. To turn it back on, press the [CA] key (next to the red [C·CE] key).

To replace the batteries, you should first have replacement batteries at hand. Two lithium-type CR2032 batteries are required.

1) Make sure the calculator is turned off. Place the calculator face down on a table with the contrast adjusting knob in the upper left-hand corner (the writing on the back of the calculator will be right-side up).

2) Remove the Software Cartridge before you replace the batteries.

3) Using a small screwdriver, remove the two screws on the back; while lifting the edge of the calculator's back cover closest to you, slide it up to remove it.

4) Refer to the diagram on the silver-colored battery compartment cover that shows how the batteries are installed. It is essential that the polarity (+ and –) of the batteries be as shown in the diagram. (If there is no diagram, notice carefully how the existing batteries are installed before removing them.) Slide the silver-colored battery compartment cover upward to open the compartment; remove the cover. The batteries are now disconnected; remove and discard them.

5) Install the new batteries, making sure the polarity is correct, and replace the battery compartment cover. (Make sure to replace the battery compartment cover--the batteries are not connected unless the battery compartment cover is in place.) Replace the back of the calculator by first hooking the 3 tabs on the top and then lowering the edge closest to you so you can replace the 2 screws. Install the Software Cartridge.

Initializing the Software Cartridge

If the calculator does not operate after you replace the batteries, you should initialize it with the following steps.

1) With a pencil or straightened paper clip and the calculator ON, push the "ALL RESET" button on the left side of the back of the calculator. You should see 4 stars in the display (2 on the left, 2 on the right).

2) Push [ENTER]. You should now see a single star at the right edge of the display.

3) Turn the calculator off, wait 2 seconds, and then turn it back on. You should see "0." in the display. The calculator is now ready to be configured.

4) Push the [Setup] key.

Adjusting the Display Contrast

The calculator is equipped with a control to adjust the contrast of the LCD (liquid crystal display). As the batteries age, the contrast will need to be adjusted from time to time. Adjust the display contrast with the knob on the right-hand end of the computer (under the On/Off switch). While looking at the display from a position about 70 degrees above the keyboard, first increase the contrast until black squares are clearly visible behind the characters and then decrease the contrast slowly until the squares just disappear. If the display contrast becomes too dim, the batteries should be replaced.

Setup Routine - [Setup] Function Key

The setup routine is used to select an aircraft for the weight & balance program and to verify the various weights and arms that are required.

A code number is required to access this routine.

Push the [Setup] key to access the setup routine.

CODE?_ Enter the appropriate code number from the following table:

360 - Update default payload weights/fuel amount
720 - Clear TAS, Dist, Latitudes & Longitudes

Clear TAS, Lat/Lon Fixes, Distance, & other values - Setup Code 720

CLEAR The "remembered" values are cleared to 0. This does not affect the weight & balance routine.

Initialize Calculator and Clear All - Setup Code 180081

Use this code to clear all memory in the calculator and initialize it. You will then need to select and install an aircraft type before you can calculate weight & balance.

Select Fuel Type & Unit – Setup Code 6865

Use this code to select JP-5 or JP-4 fuel, and to select fuel in gallons or pounds. If you change the aircraft type or set up a new aircraft, you need to complete the aircraft setup before using this routine to change the fuel type and/or unit.

USE JP-5 Y/N? USE JP-4 Y/N?	Push [Yes] to select the fuel type (press [No] to change types). (6.8 lbs/gallon for JP-5, 6.5 lbs/gallon for JP-4)
USE LBS Y/N? USE GALS Y/N?	Push [Yes] to select the fuel unit (press [No] to change units).

Update Payload Weights Selection - Setup Code 360

The user can install default weights for the pilot, co-pilot, passenger, baggage, oil and fuel. If installed, the user will be prompted with these weights and need only push [ENTER] when operating the Weight-&-Balance routine to use the displayed weight.

The calculator must be set up with an aircraft type before this routine can be used.

UPDATE WEIGHTS	This will appear for a moment to indicate that the program is now requesting entry of the weights.
PILOT xxx?_	If the default weight shown is correct, push [ENTER]; otherwise enter the desired default weight (see below).
COPILOT xxx?_	Enter the default copilot weight.
RGT PX xxx?_	Enter the default right passenger weight.
CTR PX xxx?_	Enter the default center passenger weight.
LFT PX xxx?_	Enter the default left passenger weight.
CARGO xxx?_	Enter the default weight of baggage in the cargo compartment.
OIL/LB xx.x?_	Enter the default weight of oil in pounds.
FUEL/G xx?_	Enter the default amount of fuel in gallons.
WEIGHTS DONE	

Weight-&-Balance Aircraft Selection - Setup Code 360063

WARNING: The calculations of the weight-&-balance routine are determined by the weights and arms entered and/or confirmed in this routine. Incorrect entries in this routine WILL cause incorrect center of gravity computations.

DO NOT use this routine to modify the parameters for weight-&-balance computations unless you are completely familiar with the computations for the type aircraft and you have the Airplane Flight Manual at hand to verify the arms and weights.

SELECT A/C N/Y?_	To select an aircraft (either a new one or to review the parameters of the current one), push the [YES] key.
407-AUX ?_ 407 ?_ 206L-4 N/Y?_ 206L-3 FS N/Y?_[7]	If you want to use the aircraft type shown, push the [YES] key; otherwise push the [NO] key (or [ENTER]) to proceed to the next type.
206L-3 N/Y?_ 203L-1 N/Y?_ 206B -3566 N/Y?_ 206B EX N/Y?_ 206B 3567+ N/Y?_	The calculator will list all the aircraft types – you must push the [YES] key when the type is displayed to select an aircraft type. If an aircraft is selected, the following prompts will appear; otherwise, the program will end.
RESET VALS N/Y?_	(Appears only if the type selected is the same as the type currently in use.) To reset all the weights and arms to the default values provided with the program, push the [YES] key; to simply review the existing values without resetting them, push the [NO] key.
SERIAL # xx-xxxx?_	If the serial number shown is correct, push [ENTER]; otherwise, enter the correct serial number or any other reference number you wish to use to identify an aircraft.
MGW xxxx?_	If the maximum internal gross weight shown is correct, push [ENTER]; otherwise, enter the correct weight.
MGW EXT xxxx?_	If the maximum gross weight shown, including external loads, is correct, push [ENTER], otherwise, enter the correct weight.
EMPTY xxxx?_	If the empty weight shown is correct, push [ENTER];

[7] The designation 206L-3 FS is for an aircraft with the Fuel Quantity Switch installed, and 206L-3 is for an aircraft *without* the Fuel Quantity Switch installed.

	otherwise, enter the correct empty weight.
VERIFY ARMS	This message will appear for a moment in the display. The values that are shown in the following prompts are the current (or default) longitudinal arms for the station names shown. The stations shown in these instructions are typical. The stations that actually appear may vary from one aircraft type to another.
EMPTY xxx.x?_	If the empty longitudinal arm shown is correct, push [ENTER]; otherwise enter the correct empty arm.[8]
PILOT xx.x?_	Enter the pilot longitudinal arm.
COPILOT xx.x?_	Enter the copilot longitudinal arm.
RGT PX xxx?_	Enter the right rear passenger longitudinal arm.
CTR PX xxx?_	Enter the center rear passenger longitudinal arm.
LFT PX xxx?_	Enter the left rear passenger longitudinal arm.
CARGO xxx?_	Enter the baggage compartment longitudinal arm.
OIL/LB xxx?_	Enter the oil longitudinal arm.
VERIFY LAT ARMS	Now verify the lateral arms.
EMPTY xx.x?_	Enter the empty weight lateral arm. Enter arms to the left with a leading negative sign.
PILOT xx?_	Enter the pilot lateral arm.
COPILOT -xx?_	Enter the copilot lateral arm.
RGT PX xx?_	Enter the right rear passenger lateral arm.
CTR PX xx?_	Enter the center rear passenger lateral arm.
LFT PX -xx?_	Enter the left rear passenger lateral arm.

[8] **Note on Calculating the Empty Arm:** If your Aircraft Flight Manual or last Weight & Balance computation provides you with only the empty weight and total moment, you will need to calculate the empty arm to be entered in this program. Divide the empty total moment by the empty weight and carry the result out to two or more decimal places to get the empty arm. For example, if you have an empty weight of 3315 pounds and a empty moment of 429,366 in-lbs, the empty arm is 429,366 / 3315 or 129.5222 inches.

CARGO xx?_	Enter the cargo lateral arm.
OIL/LB xx?_	Enter the oil lateral arm.
ALL OKAY Y/N?	If all the entries made are correct and as desired, respond by pushing the [YES] key. You MUST answer yes to this question to enable the weight-&-balance program for the aircraft type selected. If you push [NO], the message "INCOMPLETE" will appear and the weight-&-balance program will not operate. In this case, you must start the setup routine again and carry it to completion to enable the weight-&-balance program.
xxxxx READY	The weight-&-balance routine is ready for use.

If you want to change the fuel type or unit, run the Set Fuel Type & Unit routine on page 13 after you have completed the aircraft setup.

Fuel Arm Calculations

For each aircraft type (see tables below), the fuel quantity and longitudinal arm are stored for each 5-gallon increment as well as for up to 4 special cases: critical fuel for most forward CG condition; critical fuel for most aft CG condition, most aft CG condition, and most forward fuel CG condition.

For fuel quantities in between the 5-gallon steps, the calculated arm is pro-rated between the two 5-gallon steps except for the special cases.

If the fuel quantity falls within a 5-gallon step that also contains a special case, the 5-gallon step is broken into two parts: the calculated arm is prorated between the special case fuel quantity and the upper (or lower) 5-gallon step.

For example, if the most forward fuel CG is at 28.8 gallons, the step between 25 and 30 gallons is broken into two parts: 25.0 to 28.8 gallons, and 28.8 to 30.0 gallons.

25	117.8
28.8	114.4
30	114.7

For a fuel quantity of 28 gallons, the calculated arm is 115.1; for a fuel quantity of 29 gallons, the calculated arm is 114.5 (results rounded to nearest 1/10th of an inch).

If fuel is entered in pounds, the fuel quantity in gallons is determined by dividing the entered fuel weight by the appropriate weight[5] per gallon.

See also Computational Notes on page 6.

Aircraft Types

Bell 407-Aux and 407.

Table of gallons of fuel and longitudinal arms for 407-AUX (with auxiliary fuel).

5	133.7	35	127.8	65	116.2	95	122.3	130	129.4
10	135.0	40	122.9	70	116.1	100	123.4	135	130.2
15	135.9	45	119.1	**74.5**	116.1	105	124.5	140	131.0
20	136.4	50	116.0	75	116.3	110	125.5	145	131.7
25	136.7	**50.6**	115.7	80	118.0	115	126.5	**146.9**	132.0
28.4	137.0	55	116.1	85	119.6	120	127.5		
30	134.3	60	116.2	90	121.0	125	128.5		

Table of gallons of fuel and longitudinal arms for 407 (no auxiliary fuel).

5	133.7	30	134.3	55	116.1	80	117.7	110	124.6
10	135.0	35	127.8	60	116.2	85	119.0	115	125.6
15	135.9	40	122.9	65	116.2	90	120.3	120	126.6
20	136.4	45	119.1	70	116.1	95	121.4	125	127.5
25	136.7	50	116.0	**74.8**	116.0	100	122.3	**127.8**	127.9
28.4	137.0	**50.6**	115.7	75	116.1	105	123.4		

Bell 206L-4 and 206L-3 FS with Fuel Quantity Switch Installed

The minimum crew weight (pilot and copilot) is 170 pounds.

Table of gallons of fuel and longitudinal arms for 206L-4 and 206L-3 with Fuel Quantity Switch installed.

5	133.5	25	117.8	45	116.9	70	121.9	95	128.8
10	134.4	**28.8**	114.4	50	117.3	75	123.6	100	129.8
15	135.4	30	114.7	55	117.6	80	125.2	105	130.8
16.1	135.7	35	115.6	**60**	117.6	85	126.6	110	131.6
20	125.9	40	116.3	65	119.9	90	127.8	**110.7**	131.7

59.9 gallons is critical fuel for most forward CG condition, 110.7 is critical for most aft CG condition, most aft fuel CG is 16.1 gallons, and most forward fuel CG is 28.8 gallons.

Bell 206L-3 without Fuel Quantity Switch Installed

This aircraft has a maximum fuel capacity of 110.7 gallons. The fuel arm varies with the amount of fuel. The minimum crew weight (pilot and copilot) is 170 pounds.

Table of gallons of fuel and longitudinal arms for 206L-3 without Fuel Quantity Switch installed.

5	134.2	30	137.5	50	136.8	75	124.2	100	130.0
10	135.4	35	138.4	55	132.3	80	125.4	105	130.8
15	136.3	40	139.2	60	128.5	85	126.9	110	131.7
20	136.9	45	140.2	65	125.2	90	128.1	110.7	131.7
25	137.3	**46.9**	140.6	**70**	122.3	95	129.0		

Bell 206L-1 with Range Extender Fuel System

This aircraft has a maximum fuel capacity of 110.0 gallons. The fuel arm varies with the amount of fuel The minimum crew weight (pilot and copilot) is 170 pounds.

Table of gallons of fuel and longitudinal arms for 206L-1 with Range Extender Fuel System.

5	131.5	30	138.1	55	127.2	75	125.2	100	130.7
10	131.5	35	139.3	60	122.8	80	126.7	105	130.7
15	136.4	**39.8**	140.3	**62.5**	120.8	85	127.9	110	130.8
20	137.0	45	135.7	65	121.7	90	129.0		
25	137.4	50	131.4	70	123.6	95	129.8		

39.8 gallons is the most aft CG condition, and 62.5 gallons is the most forward CG.

Bell 206B Serial Number 1 through 3566

This aircraft has a maximum fuel capacity of 76 gallons. The fuel arm varies with the amount of fuel. The minimum crew weight (pilot and copilot) is 170 pounds.

Table of gallons of fuel and longitudinal arms for 206B Serial Numbers 1 through 3566.

5	110.1	25	110.7	45	111.6	65	114.9
10	110.6	30	110.8	50	112.5	70	115.4
15	110.7	35	110.8	55	113.5	75	115.9
20	110.7	40	111.0	60	114.2	76	116.0

Bell 206B Serial Number 1 through 3566 with Range Extender Fuel System

This aircraft has a maximum fuel capacity of 96.7 gallons. The fuel arm varies with the amount of fuel. The minimum crew weight (pilot and copilot) is 200 pounds. If there are three rear seat passengers, the maximum cargo weight in the baggage compartment is 110 pounds.

Table of gallons of fuel and longitudinal arms for 206B Serial Numbers 1 through 3566 with Range Extender Fuel System Installed.

5	110.1	25	110.7	45	111.6	65	114.9	85	116.8
10	110.6	30	110.8	50	112.5	70	115.4	90	117.1
15	110.7	35	110.8	55	113.5	75	115.9	95	117.5
20	110.7	40	111.0	60	114.2	80	116.4	96.7	117.7

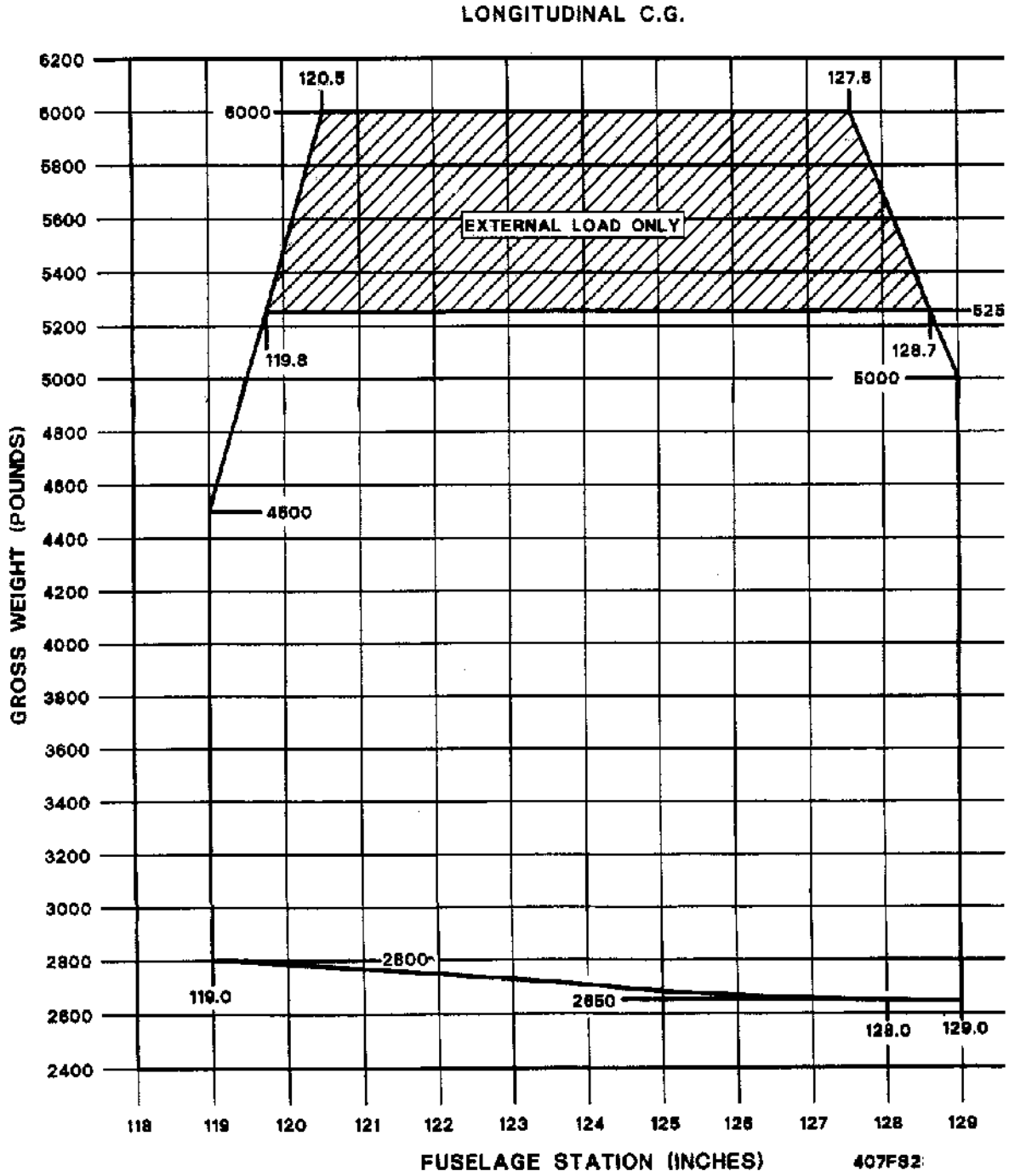
Bell 206B Serial Number 3567 and above

This aircraft has a maximum fuel capacity of 91 gallons. The fuel arm varies with the amount of fuel. The minimum crew weight (pilot and copilot) is 170 pounds.

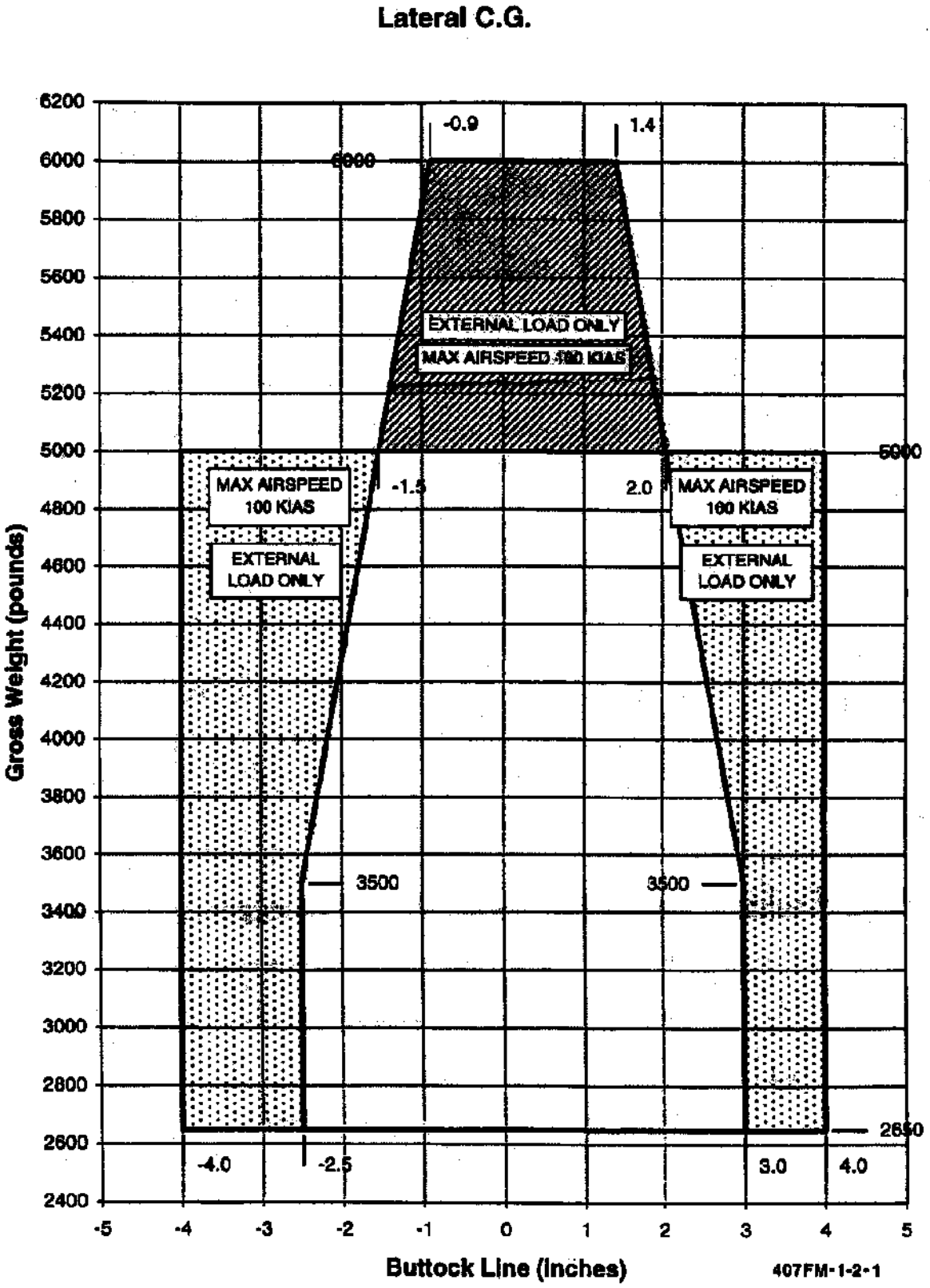
Table of gallons of fuel and longitudinal arms for 206B Serial Numbers 3567 and above.

5	110.3	25	110.8	45	112.6	65	115.8	85	117.6
10	110.7	30	110.8	50	113.8	70	116.4	90	117.9
15	110.8	35	110.9	55	114.6	75	116.8	91	118.0
20	110.8	40	111.7	60	115.2	80	117.2		

CG Envelopes for Bell 407 (with and without AUX fuel)



Bell 407 Lateral Envelope



CG Envelope for Bell 206L-1

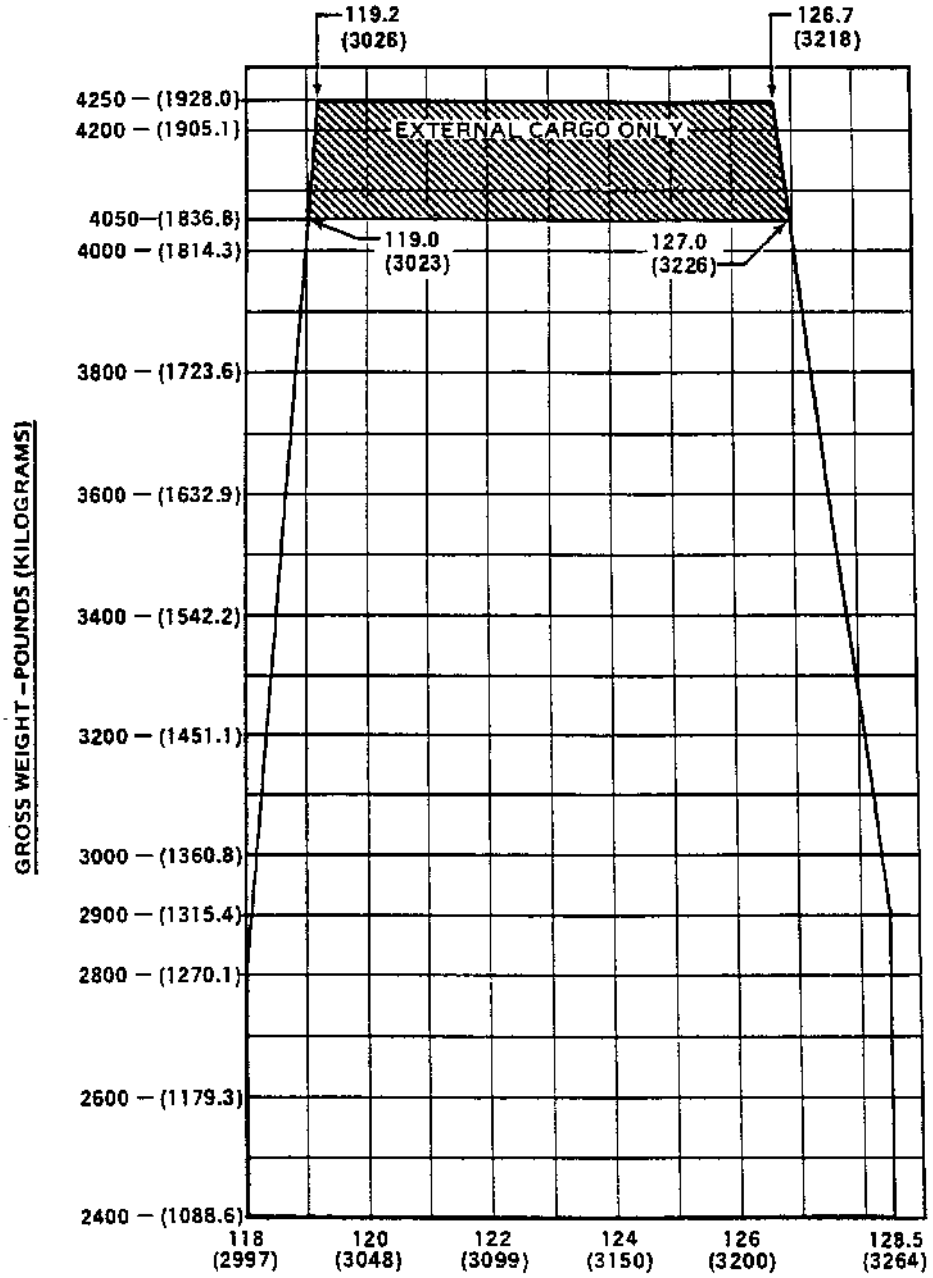
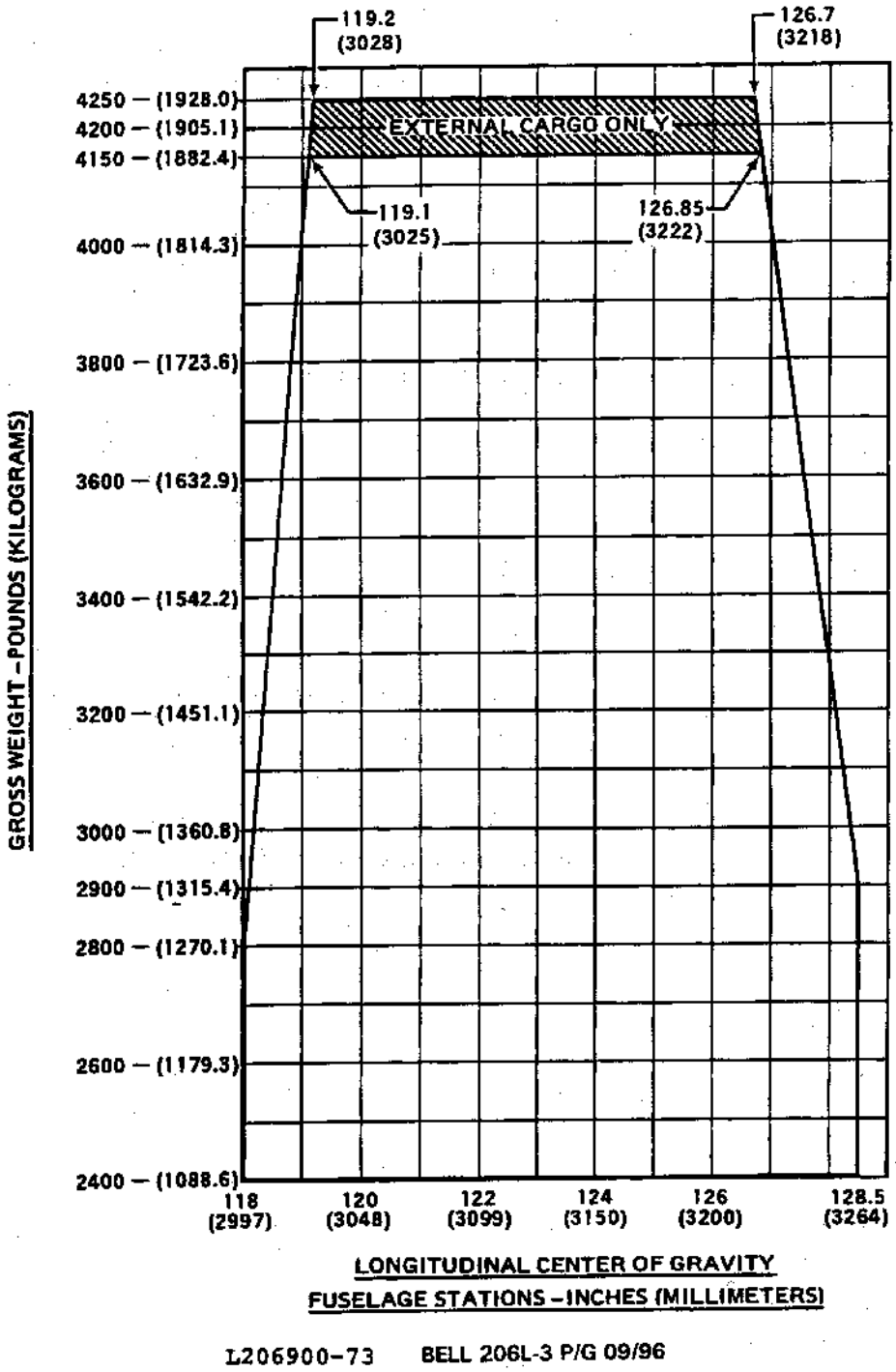


Figure 3-1. Longitudinal Center of Gravity Chart

3-4 BELL 206L-1 P/G 01/01

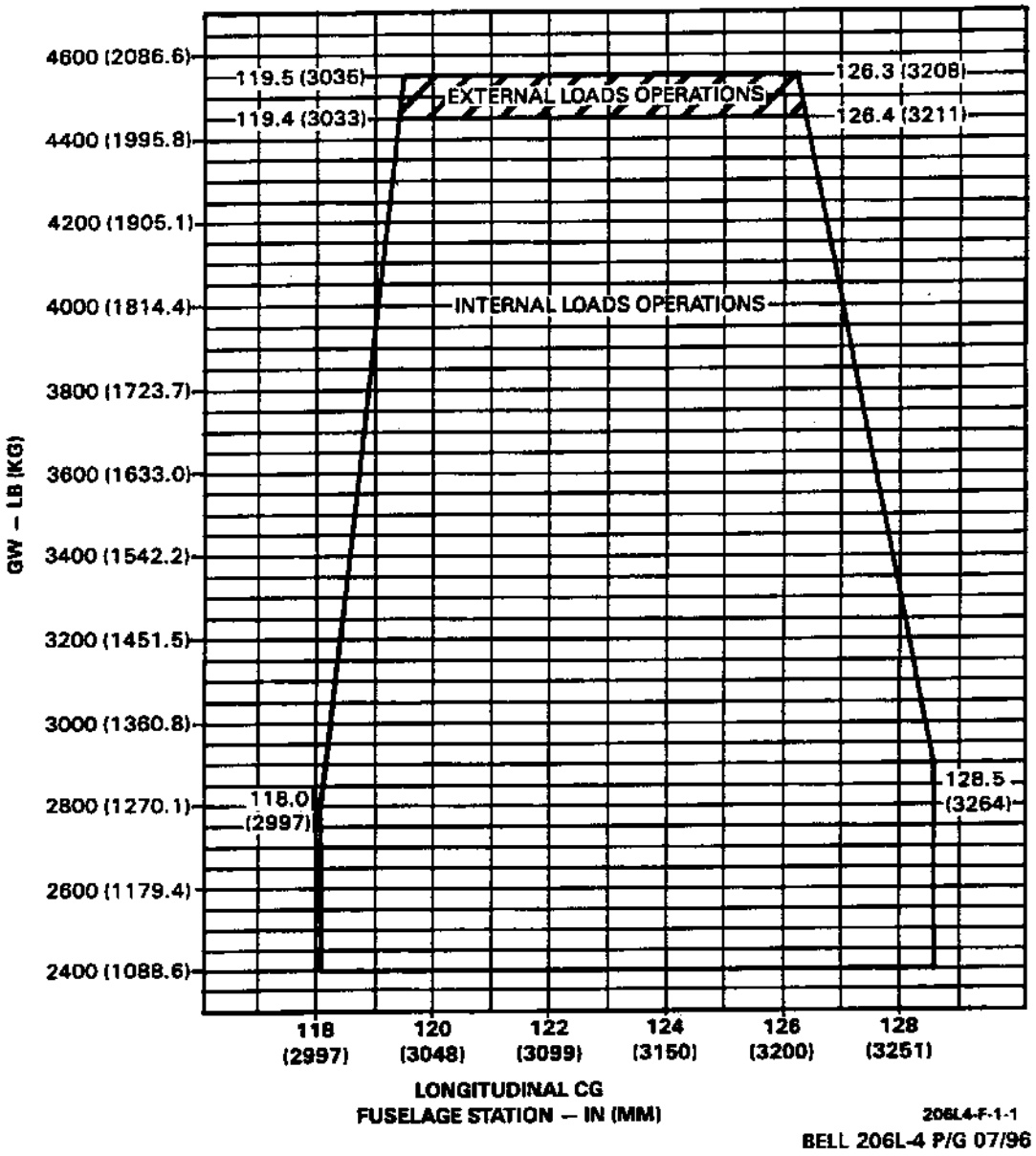
Lateral CG Limits: -4.0 inches (102 mm) to the left, 3.5 inches (89 mm) to the right of fuselage centerline.

CG Envelope for Bell 206L-3



Lateral CG Limits: -4.0 inches (102 mm) to the left, 3.5 inches (89 mm) to the right of fuselage centerline.

CG Envelope for Bell 206L-4



Lateral Limits: Up to gross weight of 4150 lbs (1882.4 kg), -4.0 inches (-102 mm) to +3.5 inches (89 mm); over 4150 lbs, -1.2 inches (-30 mm) to +1.61 inches (41 mm).

CG Envelopes for Bell 206B Series