

UNCLASSIFIED
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Date: 15 November, 1955
Aircraft: C-105 With J75 Engines
as Interim Power Plant



TL.113-55/11

Report # 7-0400-05
Sheet # 001-1 Issue 20
Prepared By: K.Griffin
Checked By: E. Burnett

INTRODUCTION

This summary is a revised Weight and C.G. estimate of the C-105 Aircraft, based on the latest design information in being on October 31st, 1955. All Weight and C.G. changes are relative to Issue 19.

GENERAL:

- (a) As in Issue 19 Pratt & Whitney J75 Engines comprise the interim Power Plant (6,175 lb. each.)
- (b) The weight of Radio & Radar carried in this issue is 2,908 lb. The system is described as "Integrated Electronic System for C-105 Aircraft with certain deviations". The breakdown into items is given in Weight Summary Issue 14.
- (c) As in issues subsequent to 15, the extended leading edge is recorded here.

1. STRUCTURE

WEIGHT (lb).

(a) Wing:

I/W Front Spar to Main Spar structure - redesign of skins, Fus. Side ribs, etc.	0
O/W Aileron Control Box - refinement of estimate	- 19
O/W Spars - general changes and strengthening Front Spar and Centre Spar	+ 30
Weight Change Increase	+ 11

Ref. 002-1

(b) Fin and Rudder:

No Weight Change	0
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(c) Fuselage To Sta. 255"

Miscellaneous Production Drawing Changes to Formers and Intake Ramp Items.	- 6
Weight Change Decrease	- 6

Ref. 002-1

(d) Fuselage 255" to 485"

The aft attachment fitting for Pack pick-up is considered part of Bulkhead 485 assy. and is included with it, hence transfer from here

	- 4
Weight Change Decrease	- 4

Ref. 002-1

34915

4052

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INTRODUCTION

		WEIGHT (lb)
1.	<u>STRUCTURE (Continued)</u>	
	(a) <u>Fuselage to Sta. 485" Aft.</u>	
	Bulkhead 485" - Production Drawing changes see also above	+ 12
	Dive Brake Accommodations - redesign Sealing	- 3
	Engine Bay - Redesign of Major Structure	+ 13
	Rear Fuselage - more detailed estimate, many gauge reductions & redesign by Stress	- 64
	Weight Change Decrease	- 42
	<u>Ref. 002-1 & 2</u>	
	<u>TOTAL STRUCTURE WEIGHT DECREASE</u>	- 41
2.	<u>LANDING GEAR</u>	
	(a) Main Undercarriage: Anti Skid Device now included with relevant Electrics and Hydraulics	- 22
	(b) Main Undercarriage Hydraulics - re-estimate of system addition of Anti-Skid valves.	+ 16
	<u>Ref. 002-3</u>	
	<u>TOTAL LANDING GEAR DECREASE</u>	- 6
3.	<u>POWER PLANT & SERVICES</u>	
	No Weight Change	
4.	<u>FLYING CONTROLS GROUP</u>	
	Mechanical Controls - re-estimate of Control Column and Rudder Pedal assys.	+ 11
	<u>Ref. 002-3</u>	
	<u>TOTAL FLYING CONTROLS INCREASE</u>	+ 11
5.	<u>EQUIPMENT</u>	
	Intake De-icing - revision of estimate to latest information	+ 51
	Electrical System - completely re-estimated	- 12
	<u>Ref. 002-3</u>	
	<u>TOTAL EQUIPMENT INCREASE</u>	+ 39
6.	<u>OPERATIONAL LOAD</u>	
	No Weight Change	

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INTRODUCTION

SUMMARY

Weight Change - Aircraft Weight Empty

Structure	-	41 lb.
Landing Gear	-	6 lb.
Flying Controls	+	11 lb.
Equipment	+	39 lb.
		<hr/>
	+	3 lb.

Weight Change - Operational Load Less Fuel

Nil

Weight Change - Operational Weight Empty - (A/C less Fuel)

Issue 19

43,660

Issue 20

43,663

= + 3 lb.

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WEIGHT CHANGES TO 7-0400-05 ISSUE 19

WEIGHT CHANGES

Wing:

- 0.40	I/W F/Spar to M/Spar Struct. - Tank # 3 Estimate to Production Drawings.	- 3.10
	Fus. Side Rib Aft. - Redesign	- 20.60
	U/C Bay Skins - one now Mg., doublers deleted etc.	- 16.70
	Auxiliary Spar - re-estimate	+ 40.00
		- 0.40
- 19.53	O/W Aileron Control Box - Estimate of Ribs to Production Drgs.	
+ 30.48	O/W Spars - Estimated to Production Drawings	
	F/Spar strengthened mainly at U/C Joint	+ 12.36
	M/Spar fwd - Minor Changes	+ 3.02
	C/Spar fwd - Minor Changes	+ 1.58
	C/Spar aft - General strengthening	+ 13.52
		+ 30.48
+ 10.55		

Front Fuselage (Fwd. Sta. 255")

+ 1.51	Formers F.F. - Alteration to Production Drawings at Sta. 176.0, 182.26 and 194.94	
- 7.32	Intake Ramp - Production Drawing estimate Sta. 207.9 Minor Chgs. Prod. Drawing estimate Sta. 228 - Alt. to Top Tie Fittings	+ 2.28
	Ribs L/E lip - reduction in gauges - refined est.	+ 1.05
	Prod. Drawing estimate Sta. 246.25 - general alt.	- 15.34
		+ 4.69
		- 7.32
- 5.81		

Centre Fuselage (Sta. 255" - 485")

- 4.46	Armament Provisions - The aft attachment fitting is considered part of Bulkhead Sta. 485" and is included with it in the duct bay component.	
- 4.46		

Aft. Fuselage (Sta. 485" Aft.)

+ 11.71	Bulkhead 485" - Seal and Skin Strip added	+ 2.95
	Arm Pick-up part of Bulkhead	+ 4.46
	Misc. Production Drawings Changes	+ 4.30
		+ 11.71

(Cont'd.)

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WEIGHT CHANGES TO 7-0400-05 Issue 19

WEIGHT CHANGES

Aft Fuselage (485th Aft.) (Cont'd)

-	2.59	Dive Brake Accommodation - Sealing now Al. was 1/4" Foam Sandwich	
-	61.41	Light Formers E.B. - Redesign Former 712 & 717 now intermediate weight also intercostals removed see new longitudinal members.	
+	12.61	Intermediate Formers E.B. - Formers 712 & 717 added also complete re-estimate.	
-	10.10	Engine Access Doors E.B. - Re-estimate to redesign, Service Doors now in separate report.	
+	43.16	Service Access Doors E.B. - Complete redesign - were included with Engine Access Doors- new report.	
-	9.09	Outer Skin E.B. - Side Skins now .051, .064 & .04 were all .051 Al. also alterations to Access and Service Door Cut-outs.	
+	4.19	Longitudinal Members E.B. - New Report, redesign were Intercostals in Light Former E.B. report.	
+	4.11	Centre Beam E.B. - redesign of E.B. - New Item	
+	30.00	Torsion Box - redesign of E.B. - New Item	
-	655.00	Rear Fuselage Complete- this report is deleted and replaced by the following:	
+	74.90	Engine Access Doors - Fixed R.F. - Weight unchanged from previous estimate - new report.	
+	28.97	Longerons & Torque Box Fixed R.F. - Weight unchanged from previous estimate - new report.	
+	89.30	Formers Fixed R.F. - New Report - Stabilizers added	+ 3.53
		General Web & Angle gauge reduc.	- 24.04
			- 20.51
+	48.74	Outer Skin Fixed R.F. - New Report - I/B Stabilizers now with formers	- 8.64
		Skin .04 Mg. was .04 Al.	- 22.15
			- 30.79
+	110.91	Tunnel Fixed R.F. - New Report - General refinement of estimate (still titanium) results in + 5.57	
+	159.85	Nacelles Removable R.F. - New Report - All Inconel X ¹ Structure Formers were .015 Steel now .012, .015 and .018	+ 6.04
		Inner Skin was .015 Steel now .012	- 9.34
		Outer Skin was .015 Steel now .01 with doublers	- 10.64
		Insulation - correct dimensions obtained	- 1.17
		Longerons - capping strips added	+ 1.43
		Miscellaneous changes latches etc.	- 7.56
			- 18.90
+	77.70	Centre Struct. & Stinger Removable R.F. - Wt. unchanged from previous estimate - New Report.	
-	42.04		

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WEIGHT CHANGES TO 7-0400-05 Issue 19

WEIGHT CHANGES

Undercarriage:

- 22.00	Main Undercarriage - Anti-skid device now included with relevant hydraulic and electrical reports.	
+ 15.72	Main Undercarriage - Addition of Anti-skid valve	+ 5.00
	Hydraulics re-estimate of piping, fittings etc.	+ 10.72
		+ 15.72

- 6.28

Flying Controls Group

+ 11.46	Flying Controls Mechanical - re-estimate Control Column	+ 3.63
	re-estimate Rudder Pedal Assy.	+ 7.83
+ 11.46		+ 11.46

Equipment - Fixed & Removable

+ 51.12	Intake De-icing - complete re-estimate - boots	+ 21.67
	equipment	+ 12.90
	wiring	+ 16.55
		+ 51.12

- 264.91 General Electrics - This report is deleted and the Electrics have been re-estimated and sub-divided as shown below:

+ 6.11	Air-Conditioning Electrics - New Report
+ 38.42	Undercarriage System - Electrics - New Report (includes Anti-Skid)
+ 12.50	External & Service Lights - New Report
+ 41.34	Fuel Value Control - Electrics - New Report
+ 36.00	Engine Services Electrics - New Report
+ 5.60	Canopy Electrics - New Report
+ 14.11	Cockpit Lighting - New Report
+ 28.72	Flight Services Electrics - New Report
+ 10.64	Fuel Capacitance Electrics - New Report
+ 31.76	Fire Detection Electrics - New Report
+ 15.30	Starting & Ignition Electrics - New Report

+ 12.94 Electrical Harness - This report was previously titled Junction Boxes and covers connectors, panels etc.

+ 39.65

+ 3.07 TOTAL WEIGHT CHANGE

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Report # 7-0400-05
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Prepared By: J. Murphy
Checked By: E. Burnett

WEIGHT AND C.G. SUMMARY

REF. No.	DESCRIPTION	WEIGHT lb.	H. ARM ins.	V. ARM ins.
	STRUCTURE	16,830.32	563.50	138.77
1000000	Wing	9,542.66	641.96	142.40
2000000	Fin and Rudder	912.02	756.74	211.22
3000000	Fuselage Structure Fwd. 255"	2,200.09	182.36	129.84
	255" to 485"	1,523.28	369.85	131.87
	Aft. 485"	2,652.27	642.15	112.15
4000000	UNDERCARRIAGE - Up Position	2,847.35	484.51	133.69
4010100	Main Undercarriage	1,825.60	540.15	141.00
4010200	Main U/C Doors & Fairings	287.32	539.21	136.40
4010300	Main U/C Hydraulics	295.56	535.95	135.20
4020100	Nose Wheel Undercarriage	294.00	169.05	100.04
4020200	Nose U/C Doors & Fairings	25.92	163.71	89.22
4020300	Nose U/C Hydraulics	118.95	220.34	103.95
5000000	POWER PLANT & SERVICES	13,888.58	654.07	118.73
5010000	Engines J75	12,647.00	662.35	117.82
5020000	Gear Box and Drive	150.00	606.00	94.66
5030000	Engine Controls	25.10	356.68	119.39
5040000	Pneumatic Starting System	70.00	610.00	94.75
5050000	Engine De-Icing	65.75	564.53	114.37
5060000	Fire Extinguishing System	64.27	700.07	123.00
5070000	Engine Mountings & Brackets	221.11	645.29	132.67
5080000	Fuel System	645.35	526.86	139.92
6000000	FLYING CONTROLS GROUP	1,723.76	646.81	139.24
6010000	Mechanical Flying Controls	784.89	671.88	145.39
6030000	Flying Controls Electronics	108.00	222.33	131.43
6000000	Flying Controls Hydraulics	830.87	678.31	134.44
	EQUIPMENT FIXED & REMOVABLE	6,535.08	303.72	114.76
7010000	Instruments	57.30	146.41	137.04
7010003	Probe	15.00	-18.00	108.00
7030000	Oxygen System	46.12	220.36	138.15
7040000	Air Conditioning System	624.95	326.22	134.63
7050000	Hydraulic Main System	215.66	591.04	117.41
7080000	Brake Parachute	68.03	794.01	126.23
7090000	Electrical System	767.74	408.86	117.65
7100000	Low Pressure Pneumatics	16.60	217.17	133.41
7110000	Oil & Hydraulic Fluid Cooling	119.80	567.91	104.22
7120000	Intake De-Icing	101.72	210.14	142.36
7000000	Radio & Radar Fixed, Power Supplies	921.10	220.05	111.00
7160000	Canopy Actuation	47.00	223.43	156.83
7170000	Cabin Consoles	20.85	177.01	125.38
7180000	Radar Door Actuation	10.00	268.00	95.00
7190000	Radome - Anti-Icing	16.80	66.35	124.40
7200000	Cabin Insulation	11.91	179.24	130.00
7210000	Cockpit Pressure Sealing	20.00	186.01	130.00

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WEIGHT AND C.G. SUMMARY

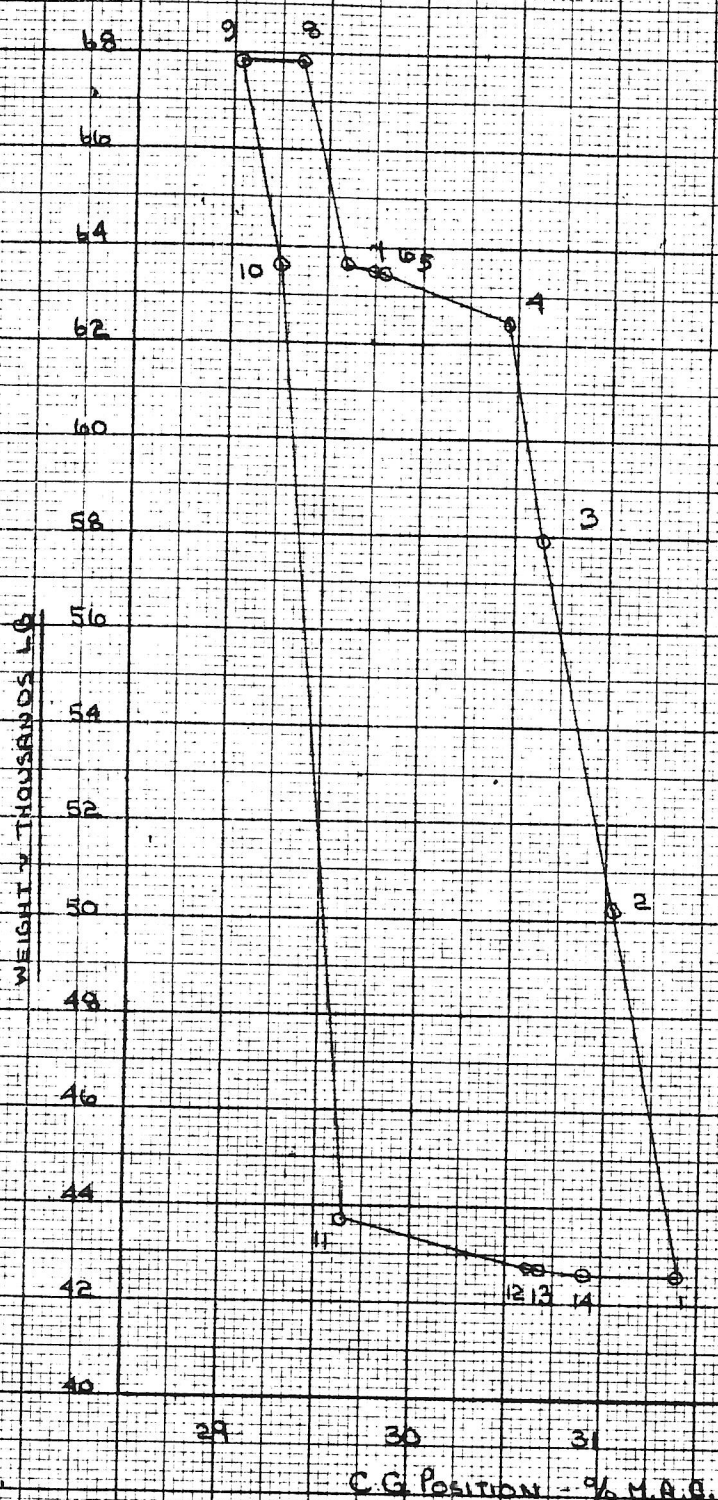
REF. No.	DESCRIPTION	WEIGHT lb.	H. ARM ins.	V. ARM ins.	C.G. POSITION % S.M.C.
	Equipment (Fixed & Remov.) (Cont'd)				
8010100	Ejector Seats	204.00	200.10	136.25	
8010200	Emergency Provisions	16.95	166.01	130.65	
8020000	Radar Removable	1,259.70	143.20	114.53	
8000000	Radio Removable & I.F.F.	276.20	284.51	123.98	
8050100	Missile Pack Structure	676.17	385.26	95.61	
8050200	Missile Pack Mechanisms	410.48	373.88	102.86	
8050300	Missile Pack Hydraulics	293.00	366.29	101.00	
8050400	Missile Pack Electronics	318.00	389.15	101.22	
	AIRCRAFT WEIGHT EMPTY	41,825.09	551.03	128.04	
9000000	USEFUL LOAD	17,135.67	521.88	140.24	
9010000	Crew	430.00	194.00	136.50	
9020000	Oil	85.08	611.71	135.00	
9050000	Alcohol For Radome De-Icing	22.00	93.00	138.00	
9060000	Engine Fire Extinguisher Fluid	25.00	730.00	129.00	
9070000	Residual Fuel	219.80	536.70	135.07	
9090000	Fuel for Combat Mission	15,298.00	539.25	143.50	
9030000	Missiles (Armament)	1,042.40	399.12	95.60	
9040000	Oxygen Charge	13.39	259.69	159.91	
	Normal Combat Mission U/C Up	58,960.76	542.56	131.59	29.44
	U/C Down		544.12	129.46	29.87
	Half Combat Mission Fuel 981 @ 7.8 lb/gal.	7,649.00	540.95	139.60	
	Combat Weight (Half Combat Mission Fuel) U/C Up	51,311.76	543.31	129.23	29.64
	U/C Down		545.09	126.78	30.13
	Operational Weight Empty U/C Up	43,662.76	543.72	127.41	29.76
	U/C Down		545.82	124.54	30.34
	Operational Weight Empty (Less Missiles) U/C Up	42,620.36	547.26	128.19	30.73
	U/C Down		549.41	125.25	31.33
	Maximum Internal Fuel 2,544 gal. @ 7.8 lb/gal. Water (Air-Conditioning System)	19,843.00 125.00	538.88 268.00	144.33 95.00	
	A.U.W. Max. Internal Fuel U/C Up	63,630.76	541.67	132.62	29.19
	U/C Down		543.11	130.65	29.59
	Max External Fuel 500 gal. @ 7.8 lb/gal. and Drop Tank	4,210.00	528.88	62.00	
	A.U.W. Max. Internal & External Fuel U/C Up		540.88	128.24	28.97
	U/C Down	67,840.76	542.23	126.39	29.35

REPORT NO: 7-0400-05 ISSUE 20

Ex. Karlheinz Zingl

DATE: Oct 31st 1955

C105 A/C C.G. ENVELOPE
FOR A/C FLIGHT CONDITIONS
WITH J75 AFTER ENGINES

[illegible]

N.B. IN ORDER TO BRING POINT ①
TO THE AFT LIMIT (C 31% MAC
141 LB GALLEST MUST BE
ADDED AT STA 120.03

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