QC
Avro
C-105
7-0400-44
iss. 5

QC X
Avro
CF105
R-7-040044
Iss-5

FILE IN VAULT

C-105 MK 1 Report # 7-0400-44
J75 P3 Engines Issue 5

WEIGHT SUMMARY & C.G. POSITION

R.C.A.F. SECRET UNCLASSIFIED May 1/57

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Report no.: QCX - AVRO - CF105 - R-7-0400-44-Iss-5

has been [ ] downgraded to : _____

[XX] de-classified

by (Name): Michel W. Drapeau

(Dept.): A/DND Coordinator, Access to Information

Date: Dec. 7, 1992

R. Auger
Signature

Templin

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C-105 MK 1 With
J75 P3 Engines
1st. A/C

Report # 7-0400-44-Iss. 5
Sheet # 1-1
Prepared By: K. Griffin
Approved By: E. Burnett

## INTRODUCTION

The following is a Weight and C.G. Summary for the 1st C-105 MK 1 Aircraft with J75 P3 Engines, based on the latest weight estimates currently available. All Weight and C.G. changes are relative to Issue 4 of April 1st, 1957.

Note: This summary does NOT apply for the 2nd and subsequent MK 1 Aircraft see context below.

## GENERAL

a) Pratt & Whitney J75 P3 Engines comprise the Power Plant for the 1st Aircraft. J75 P5 Engines, which are partially redesigned versions of the P3 Engines, are to be installed on the 2nd and subsequent MK 1 Aircraft. (J75 P3 Engines = 6,175 lb each; J75 P5 Engines = 5,950 lb each)

b) An Instrument Package carrying Flight Test Instrumentation is installed, this also varies between first and subsequent Aircraft. A preliminary estimate of other Flight Test installations has now been made, information available is far from complete, but based on there being approximately 250 monitored points throughout the aircraft and that twin shielded wire (27 lb/1000 ft.) is used, a tentative figure of approximately 710 lb is now recorded. This will be fully checked when completed details are forthcoming.

c) Emergency jettison for the pack, emergency lowering for the Undercarriages and additional fire protection, all to be installed on the 1st A/C, are allowed for in this summary.

d) An Interim Radio & Radar system is installed.

e) It should be noted that due to material substitutions and shop variations introduced by planning or production departments there is a weight penalty to the structure to-date of 198 lb. This is all recorded in the structural weight breakdown. No account has been taken of concessions on machinings etc. since it is impossible to assess these.

f) Pending Flight Test requirements a "Buzz Damping" system may be installed on the 1st Aircraft. Provisions for this installation are already included in the Structural group. The "Buzz Damper" system weights are not currently recorded, but they incur a weight penalty of 134 lb if necessary.

g) A considerable number of actual weights have now been obtained. Structural weights are showing very insignificant deviations from the calculated weight, but equipment shows a consistent increase averaging about 11% over manufacturers quotations or specification weights.
Preceeding the report titles, on the I.B.M. tabulation sheets, will be found a number varying from 0 to 100 this is the percentage actual weight recorded within the report.

continued.

Classification cancelled / changed to: UNCLASSSIFIED
By authority of: DRDA 7/DARFT 5-8/DAS Eng 6-4-5
Date: 5 Nov 1992
Signature: B. Aubrey
Unit / Rank / Appointment: DSIS 3, Secretary CRAD HQ DRP

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INTRODUCTION

GENERAL

g)(Continued)

A Summary of Actual Weights recorded so far is as follows:

| | | |
|---|---|---|
| Structure | 29.20 % | Actual Weight |
| Undercarriage | 64.60 % | Actual Weight |
| Power Plant | 4.80 % | Actual Weight |
| Flying Controls | 18.77 % | Actual Weight |
| Equipment | 10.87 % | Actual Weight |

i.e. 19.75% of the Basic Weight of the Aircraft.
The above breakdown is for groups as designated on the Weights Summary Sheets.

1. STRUCTURE

a) Wing:

| | WEIGHT (lb) |
|---|---|
| I/W Ribs - Production drawing changes & actual weights | - 14 |
| O/Wing - Actual weight, less Leading Edge and Aileron Control Box | 0 |
| WEIGHT CHANGE DECREASE Ref.2-1 | - 14 |

b) Fin & Rudder

No Weight Change

c) Fuselage Fwd. Sta. 255"

| | |
|---|---|
| Actual weights of fittings, production drawing design changes, material concessions etc. etc. | + 17 |
| WEIGHT CHANGE INCREASE Ref. 2-1 | + 17 |

d) Fuselage Sta. 255"-485"

No Weight Change

e) Duct Bay Sta. 485"-591.65"

| | |
|---|---|
| Actual weights of Dive Brakes, machined frames, beams etc. | + 3 |
| WEIGHT CHANGE INCREASE Ref. 2-2 | + 3 |

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INTRODUCTION

| | WEIGHT (lb) |
|---|---|
| 1. STRUCTURE (Continued) | |
| f) Engine Bay Sta. 591.65-742.5" | |
| Miscellaneous production drawing changes, none major, some actual weights obtained. This entire structure has been brought in line with current issues of production drawings | + 16 |
| WEIGHT CHANGE INCREASE Ref. 2-2 | + 16 |
| g) Rear Fuselage Sta. 742.5" Aft. | |
| No Weight Change | |
| h) Joints - Fuselage | |
| No Weight Change | |
| TOTAL STRUCTURAL WEIGHT INCREASE | + 22 |
| 2. LANDING GEAR | |
| Main U/C Doors & Fairings - addition of bumper pads | + 4 |
| other re-estimates and redesign | - 7 |
| LANDING GEAR DECREASE Ref. 2-2 | - 3 |
| 3. POWER PLANT & SERVICES | |
| Fuel System - Estimates revised of all wing installations increased allowances sealing & insulation tank # 3 etc. etc. | + 49 |
| N. B. If .035 thick piping replaced .049 for many transfer & pressure pipes, as called for on drawings, approx. 20 lb could be saved. However, .049 thick pipes in stock will be installed on 1st 5 Aircraft. | |
| Accessories Gear Boxes - Actual weights of some boxes and shafts have now been obtained | - 8 |
| POWER PLANT INCREASE Ref. 2-3 | + 41 |

C-105 MK 1 with
J75 P3 Engines
1st Aircraft
Date: May 1/57

Report # 7-0400-44 Iss 5
Sheet # 1-4
Prepared By: K. Griffin
Approved By: E. Burnett

## INTRODUCTION

| | WEIGHT (lb) |
|---|---|
| **4. FLYING CONTROLS GROUP** | |
| No Weight change | |
| **5. EQUIPMENT GROUP** | |
| Interim Radio & Radar - error in relay weights | - 8 |
| Instrument Pack Structure - actual weight | + 14 |
| Flight Test Installations - initial preliminary allowance | + 711 |
| TOTAL EQUIPMENT INCREASE | + 717 |
| **6. OPERATIONAL LOAD** | |
| No Weight Change | |

## SUMMARY

Weight Change - Aircraft Basic Weight

| | |
|---|---|
| Structure | + 22 lb. |
| Landing Gear | - 3 lb. |
| Power Plant | + 41 lb. |
| Equipment | + 717 lb. |
| | + 777 lb. |

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

| Issue 4 | Issue 5 | |
|---|---|---|
| 45,240 lb. | 46,017 lb. | + 777 lb. |

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C-105 MK 1 With
J75 P3 Engines
1st Aircraft
Date: May 1/57

Report # 7-0400-44 Iss. 5
Sheet # 2-1
Prepared By: K. Griffin
Checked By: E. Burnett

DETAILED WEIGHT CHANGES TO I.B.M.
TABULATED DETAILS OF APRIL 1st, 1957

| WEIGHT CHANGES | | | WEIGHT (lb) |
|---|---|---|---|
| **Wing:** | | | |
| - 13.92 | I/W Ribs # 1 to 9 - | Actual weights obtained account for | - 10.22 |
| | | Miscellaneous bracketry added | + 0.62 |
| | | Hardware changes etc. | - 4.32 |
| | | | - 13.92 |
| + 0.21 | O/W Skins - | Addition of Access Panel R.H. only | + 1.43 |
| | | Design changes to hardware, skin to spar joints etc. | - 4.71 |
| | | Actual weight skin bottom main panel | + 3.34 |
| | | Actual weight skin top aft panel | + 0.15 |
| | | | + 0.21 |
| | N. B. | A complete outer wing less leading edge and aileron control box was weighed. After allowing for wiring installed there was no change between calculated weight and actual weight of structure. | |
| - 13.71 | | | |
| **Fuselage Fwd. Sta. 255"** | | | |
| + 2.14 | Top Longerons F.F. - | Actual weights of welded fitting, end fittings & some pressings | - 1.03 |
| | | Miscellaneous brackets etc. | + 0.32 |
| | | Mg. Packers, previously estimated before design requirements complete | + 2.85 |
| | | | + 2.14 |
| + 4.75 | Nose U/C Support Structure - | Drag. strut fitting re-estimated | + 0.32 |
| | | Door jack fitting was omitted | + 1.66 |
| | | Cross beam & U/C pick-up, some redesign, some actual weights etc. | + 2.77 |
| | | | + 4.75 |
| + 5.52 | Miscellaneous items F.F. - | Internal marry-up hardware, misc. brackets etc. called up on final G.A's | |
| + 4.20 | Intake Ramp - | Material concessions Al. replaces Mg. on duct fittings Formers 207.94, 214.43 & 228.0 | + 2.49 |
| | | Stiffeners added Former 207.94 | + 0.47 |
| | | Actual weight Leading Edge | + 0.18 |
| | | Actual weight Former 175.5 | + 1.06 |
| | | | + 4.20 |
| + 0.30 | Lower Shear Panel - | minor production drawing changes | |
| + 16.91 | | | |

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C-105 MK 1 With
J75 P3 Engines
1st. Aircraft
Date: May 1/57

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Report # 7-0400-44 Iss. 5
Sheet # 2-2
Prepared By: K. Griffin
Checked By: E. Burnett

DETAILED WEIGHT CHANGES TO I.B.M.
TABULATED DETAILS OF APRIL 1st, 1957

| WEIGHT CHANGES | | WEIGHT (lb) |
|---|---|---|
| **Duct Bay Sta. 485"-591.65"** | | |
| + 2.28 | Dive Brakes - Actual weight obtained | + 0.88 |
| | Marry-up (early estimate prior to drawing release) | + 1.40 |
| | | + 2.28 |
| + 0.14 | Frame Sta. 538.77" - Actual weights of all machinings | |
| + 2.28 | Longitudinal Beams - Actual weight of I/B and O/B D/Brake beams | |
| - 1.89 | Top Longeron - duplication of some joint items at Sta. 485. | |
| + 2.81 | | |
| **Engine Bay Sta. 591.65"-742.5"** | | |
| + 6.36 | Engine Tunnel - redesign rear centre Engine Mounting Seal | + 3.56 |
| | Minor production drawing changes | + 2.80 |
| | | + 6.36 |
| + 1.22 | Heavy Formers - some actual weights obtained | |
| + 0.66 | Light Formers - minor production drawing changes | |
| - 0.59 | Intermediate Formers - boom reductions bottom formers Sta. 712.34 | |
| + 1.67 | Outer Skin - miscellaneous production drawing changes | |
| + 2.76 | Torsion Box - miscellaneous changes, increase in diaph. gauges etc. | |
| + 0.48 | Centre Beam Sta. 697-717 - wall thickness increase strut tube Sta. 714 etc. | |
| + 0.80 | Engine Access Doors - minor production drawing changes | |
| + 2.50 | Service Access Doors - First production drawing estimates # 2 door | + 1.75 |
| | Minor other changes | + 0.75 |
| | | + 2.50 |
| + 0.02 | Longitudinal Members - minor production drawing change | |
| + 0.06 | Miscellaneous Items E B - minor production drawing change. | |
| + 15.94 | | |
| **Landing Gear Group** | | |
| - 2.56 | Main U/C Doors & Fairings - completely re-estimated to current drawings. | |
| | Addition of Bumper pads | + 3.64 |
| | Half hinge & pin (was assumed, incorrectly, to be with surround structure) | + 3.57 |
| | Miscellaneous redesign on door | + 2.83 |
| | Springs, housings etc. were estimated initially far too heavy | - 12.60 |
| | | - 2.56 |
| - 2.56 | | |

C-105 MK 1 With
J75 P3 Engines
1st A/C
Date: May 1/57

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Report # 7-0400-44 Iss 5
Sheet # 2-3
Prepared By: K. Griffin
Approved By: E. Burnett

DETAILED WEIGHT CHANGES TO I.B.M.
TABULATED DETAILS OF APRIL 1st, 1957

| WEIGHT CHANGES | | WEIGHT (lb) |
|---|---|---|
| **Engine Group** | | |
| + 48.84 | Fuel System - All estimates revised with results as follows:- | |
| | Trial Installation tank unit # 5 | + 3.30 |
| | Addition of sealing piping | + 8.54 |
| | Insulation & sealing tank # 3* | + 35.66 |
| | Miscellaneous other changes | + 1.34 |
| | | + 48.84 |

* 1) 20 lb was allowed for all insulation & sealing - this on checking proved inadequate but will be sufficient for tanks # 4 to 8 inclusive, hence above addition

2) The above estimate includes many transfer & pressure pipes of .049 wall thickness (in stock for 1st 5 A/C) however, .035 wall thickness may be used as an alternative (now called on drawing as such) with a saving of 20.50 lb.

| | | |
|---|---|---|
| - 4.60 | Accessories Gear Boxes on Fuselage - Actual weights now recorded for some gear boxes and shafts. Sargents estimates were slightly too high. | |
| - 3.42 | Accessories Gear Boxes & Starter on Engine - Actual weights of some items obtained. | |
| + 40.82 | | |
| **Equipment Fixed & Removable** | | |
| - 8.15 | Interim Radio & Radar - error in relay weights | |
| + 14.19 | Instrument Pack Structure - Actual weight obtained - previous estimate was to incomplete early drawings. | |
| + 710.50 | Flight Test Installations - preliminary allowance for approx. 250 monitored points. | |
| + 716.54 | | |
| + 776.75 | TOTAL WEIGHT CHANGE | |

Date: May 1st, 1957
Aircraft: C-105 MK 1 with J75 P3 Engines 1st A/C

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Report # 7-0400-44-Iss. 5
Sheet # 3-1
Prepared By: K. Griffin

WEIGHT AND C.G. SUMMARY

| Description | WEIGHT lb | H. ARM ins. | V. ARM ins. |
|---|---|---|---|
| STRUCTURE | 18,509.69 | 562.50 | 137.44 |
| Wing | 9,982.42 | 643.24 | 142.11 |
| Fin & Rudder | 1,029.70 | 754.74 | 209.56 |
| Fuselage fwd Sta. 255" | 2,600.35 | 181.29 | 127.97 |
| Sta. 255"-485" | 1,650.42 | 379.43 | 130.03 |
| Sta. 485"-591.65" | 1,003.86 | 533.87 | 104.55 |
| Sta. 591.65"-742.5" | 1,418.18 | 660.80 | 107.30 |
| Aft. Sta. 742.5 | 772.18 | 800.51 | 129.11 |
| Marry-Up | 52.58 | 468.91 | 103.89 |
| UNDERCARRIAGE - RETRACTED | 2,609.77 | 488.51 | 134.93 |
| Main Undercarriage | 1,959.62 | 539.48 | 141.00 |
| Main U/C Doors & Fairings | 291.80 | 537.10 | 138.40 |
| Nose Undercarriage | 333.81 | 170.81 | 99.70 |
| Nose U/C Door & Fairing | 24.54 | 162.24 | 88.23 |
| POWER PLANT & SERVICES | 14,302.51 | 653.47 | 120.31 |
| Engines & Accessories J75 P3 | 12,557.91 | 664.92 | 119.80 |
| Gear Box Installation on Fuselage | 275.54 | 601.39 | 102.98 |
| Gear Box & Starter on Engine | 259.65 | 591.55 | 104.52 |
| Engine Controls | 32.43 | 375.76 | 118.62 |
| Engine Nose Bullet | 70.37 | 562.80 | 115.09 |
| Fire Extinguishing System | 70.46 | 702.44 | 134.83 |
| Engine Mountings | 198.75 | 635.50 | 127.97 |
| Fuel System | 837.40 | 536.65 | 136.07 |
| FLYING CONTROLS GROUP | 1,819.56 | 687.03 | 139.99 |
| Mechanical Flying Controls | 942.92 | 688.24 | 148.66 |
| Hydraulic Flying Controls | 876.64 | 685.72 | 130.67 |
| EQUIPMENT FIXED & REMOVABLE | 7,806.98 | 402.37 | 111.46 |
| Instruments | 46.07 | 163.68 | 138.70 |
| Probe | 18.50 | 40.00 | 108.00 |
| Cockpit Pressure Sealing | 5.00 | 186.00 | 130.00 |
| Oxygen System | 43.44 | 227.72 | 142.18 |
| Air Conditioning System | 738.02 | 336.49 | 134.76 |
| Surface Finish | 100.00 | 591.52 | 140.20 |
| Hydraulic Main System | 597.49 | 498.76 | 116.66 |
| Cabin Insulation | 14.31 | 187.48 | 132.00 |
| Brake Parachute | 62.38 | 769.41 | 143.24 |
| Electrical System | 1,105.89 | 419.52 | 112.93 |
| Low Pressure Pneumatics | 49.30 | 444.28 | 125.94 |
| Intake De-icing Boots | 51.84 | 197.02 | 118.00 |
| Canopy Actuation | 62.05 | 222.11 | 154.47 |
| Cabin Consoles | 17.45 | 174.76 | 124.34 |
| Ejector Seats | 186.00 | 201.10 | 136.25 |
| Interim Radio & Radar | 690.98 | 322.67 | 123.64 |
| Instrument Pack Structure | 684.80 | 385.90 | 94.71 |
| Pack Instrumentation - 1st A/C | 2,447.00 | 389.50 | 95.00 |
| Flight Test Installations | 710.50 | 570.00 | 120.00 |
| Additional Fire Protection - 1st A/C | 154.17 | 425.05 | 102.89 |
| Emergency Landing Gear Lowering | 12.91 | 458.83 | 128.60 |

continued.

Date: May 1st, 1957
Aircraft: C-105 MK 1 with
J75 P3 Engines
1st, A/C

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Report # 7-0400-44-Iss. 5
Sheet # 3-2
Prepared By: K. Griffin

WEIGHT & C.G. SUMMARY

| Description | | WEIGHT lb | H. ARM ins. | V. ARM ins. | M.A.C. % |
|---|---|---|---|---|---|
| Equipment (Fixed & Removable)(Cont'd.) | | | | | |
| Radome Anti-icing | | 8.88 | 51.49 | 125.00 | |
| AIRCRAFT BASIC WEIGHT | | 45,048.51 | 564.38 | 127.46 | |
| USEFUL LOAD (less fuel) | | 968.02 | 354.76 | 132.64 | |
| Crew | | 430.00 | 194.00 | 136.50 | |
| Oil | | 134.23 | 608.92 | 115.68 | |
| Alcohol - radome de-icing | | 22.00 | 93.00 | 138.00 | |
| Engine Fire Extinguisher Fluid | | 25.00 | 730.00 | 129.00 | |
| Residual Fuel | | 218.40 | 553.98 | 134.04 | |
| Oxygen Charge | | 13.39 | 259.69 | 159.91 | |
| Water for Air Conditioning | | 125.00 | 268.00 | 132.00 | |
| Operational Weight Empty | U/C Up | 46,016.53 | 559.97 | 127.57 | 34.24 |
| | U/C Down | | 562.10 | 124.05 | 34.83 |
| Maximum Internal Fuel (2,544 gals. @ 7.8 lb/gal.) | | 19,843.00 | 538.88 | 144.32 | |
| A.U.W. Max. Internal Fuel | U/C Up | 65,859.53 | 553.62 | 132.62 | 32.49 |
| | U/C Down | | 555.10 | 130.16 | 32.89 |

N.B. 1) A/C datum is considered to be 120" above an arbitrarily chosen ground line.

2) Above figures are for the aircraft in the unballasted condition.

If the most aft point on the C.G. Envelope is to be ballasted to 31% M.A.C. then the 1,382 lb of ballast at Sta. 89.16, as currently provided for on Former Sta. 68.5 and the Shear Panel, is necessary, plus a further 100 lb on the Shear Panel (i.e. Total 1,482 lb)

REPORT No: T-9400-46-3
BY: Kathleen Griffin
DATE: May 1st 1954
SHEET: 4-1

HORIZONTAL C.G. ENVELOPE

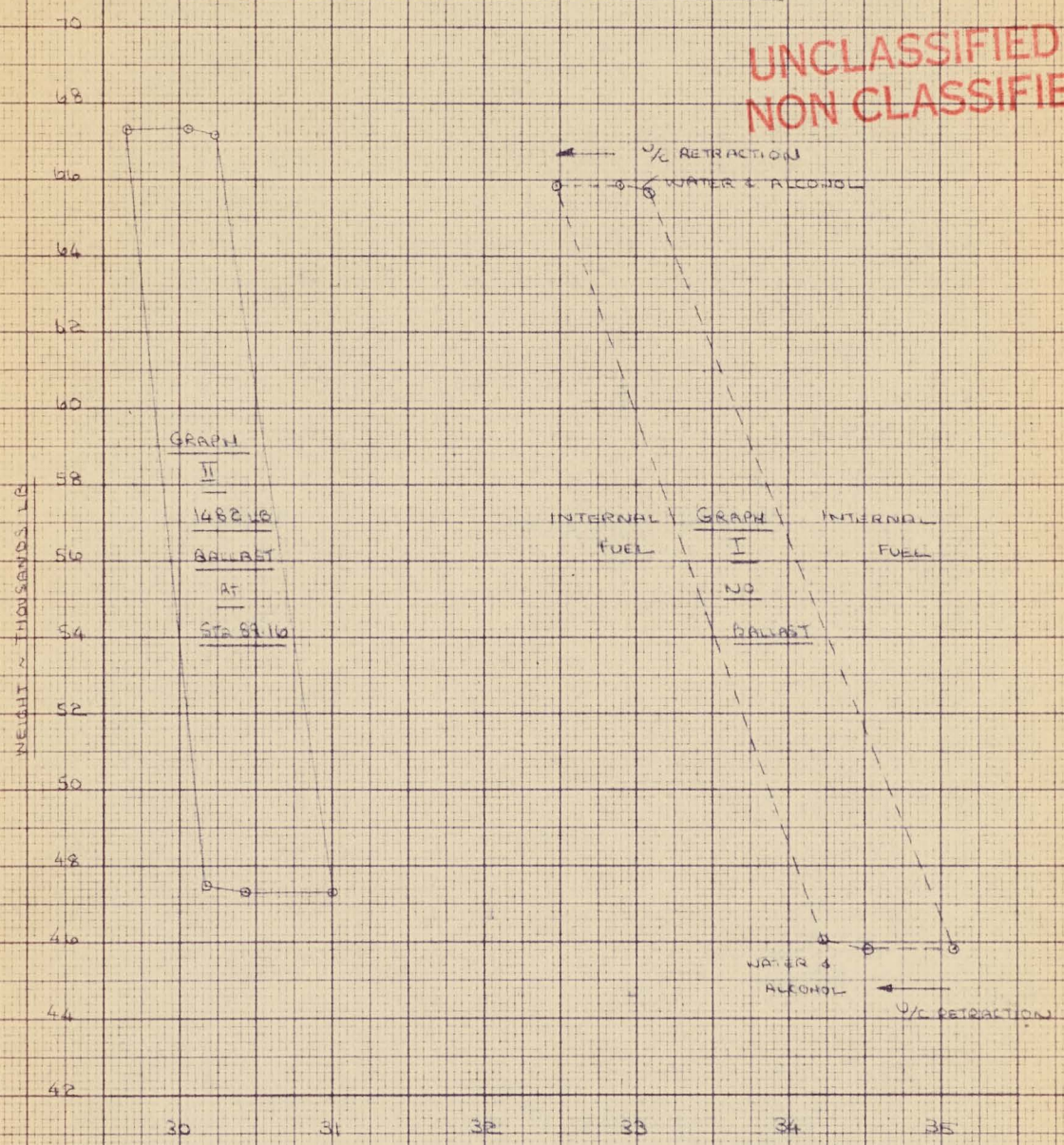
C105 (MK I) A/C FLIGHT CONDITIONS

WITH J79 P3 ENGINES (2nd & SUBSEQUENT A/C J76 P5 ENGINES)

a) INTERIM RADIO & RADAR

b) FUEL SYSTEM PROPORTIONERS

c) INSTRUMENT PACKAGE & FLIGHT TEST INSTALLATIONS

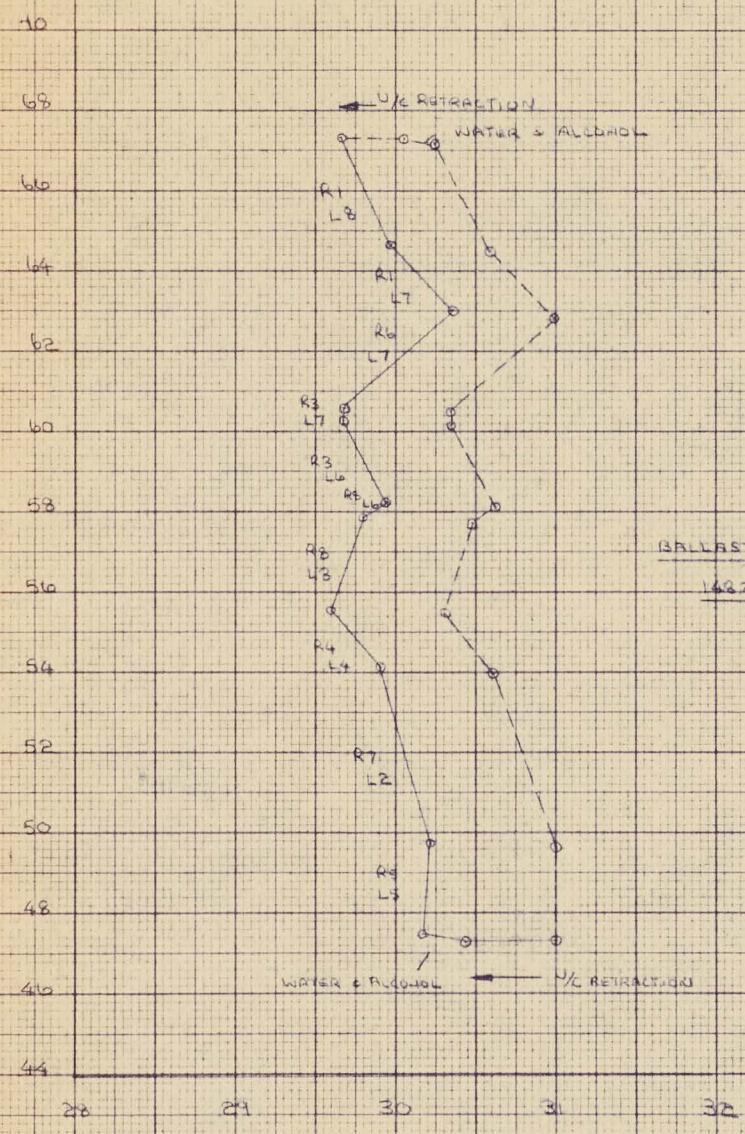



G9-12
10 X 10 TO THE ½ INCH
MADE IN CANADA

REPORT NO: 1-0400-64-5
BY: [illegible]
DATE: May 1st 1964
SHEET: 4-2

HORIZONTAL C.G. ENVELOPE
CIOS MK I 1ST A/C FLIGHT CONDITIONS
WITH
PROPOSED FUEL SYSTEM SEQUENCING

SEQUENCING ORDER: (Imp. PINS #121)
R.H.S. ~ 1, 6, 3, 8, 4, 7, 5 (NOTED R1, R6 etc)
L.H.S. ~ 8, 7, 6, 3, 4, 2, 5 (NOTED L8, L7 etc)
— — — — U/C EXTENDED
———— U/C RETRACTED




BALLAST INSTALLED
1682 LB AT STA 89.14

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G9-12
10 X 10 TO THE ½ INCH
MADE IN CANADA

**AVRO AIRCRAFT LTD.**
MALTON, ONT.

PROJECT C-105 MK 1

# WEIGHT AND C. OF G BY FUNCTIONAL COMPONE

| | DESCRIPTION | REFERENCE NO. | COMP. NO. | WEIGHT | H |
|---|---|---|---|---|---|
| | TOTAL WING GROUP | 1000000 | | | |
| | OUTER WING | 1010000 | | | |
| 100 | OUTER WING SKINS | 101000164 | | 929107 | 0 |
| 100 | POSTS AND INTERCOSTALS | 101000264 | | 24367 | 3 |
| 100 | OUTER WING SPARS | 101000364 | | 392587 | 0 |
| 100 | OUTER WING RIBS | 101000464 | | 134569 | |
| 18 | AILERON CONTROL BOX | 101000664 | | 379207 | 7 |
| 100 | RIB 12 | 101000764 | | 76266 | 4 |
| 100 | O W AILERON JACK FITTING | 101000964 | | 10467 | 2 |
| | AILERON JOINTS AND FAIRING | 1010010 | | 32937 | 8 |
| | BUZZ DAMP STRUC PROV O W | 101001164 | | 8707 | 5 |
| | | | | 198815 | |
| | AILERON | 1020000 | | | |
| 100 | AILERON STRUCTURE | 102000174 | | 336007 | 9 |
| | BUZZ DAMP STRUC PROV AIL | 102000274 | | 6307 | 3 |
| | | | | 34230 | |
| 97 | ELEVATOR | 103000082 | | 449007 | 5 |
| 97 | ELEVATOR MARRY UP | 1030000 | | 15977 | 3 |
| | BUZZ DAMP STRUC PROV ELEV | 103000182 | | 7407 | 4 |
| | | | | 47237 | |
| | INNER WING | 1040000 | | | |
| 55 | MAIN U C STRUCTURE | 104000162 | | 3382357 | |
| 51 | FRONT SPAR I W | 104000262 | | 1111048 | |
| 51 | MAIN SPAR I W | 104000362 | | 1510656 | |
| 51 | FWD CENTRE SPAR I W | 104000462 | | 536460 | |
| 51 | AFT CENTRE SPAR I W | 104000562 | | 366665 | |
| 51 | REAR SPAR I W | 104000662 | | 766770 | |
| 21 | I W STRUCTURE F S TO M S | 104000762 | | 10418549 | |
| | I W STRUCTURE M S TO R S | 104000862 | | 1497960 | |
| | STRUCTURE AFT OF REAR SPAR | 104000962 | | 3231271 | |
| 11 | ELEVATORCONTROLBOX I W | 104001062 | | 4271772 | |
| | TRANSP JOINT MARRY UP | 1040011 | | 706563 | |
| | CENTRE LINE JOINTS | 104001262 | | 6374666 | |
| 45 | INNER WING SKINS | 104001362 | | 21855062 | |
| | STRUT PICK UP FITTINGS I W | 104001462 | | 542256 | |
| 31 | RIBS 1 TO 9 INNER WING | 104001662 | | 5120461 | |
| | DORSAL FAIRINGS I W | 104001762 | | 9548 | |
| 100 | RIB 10 | 104001862 | | 1080063 | |
| | FUSELAGE HINGE JOINT I W | 104001962 | | 1381262 | |
| | TRANSP JOINT | 104002062 | | 1310063 | |

# EIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. 7-0400-44 Iss 5

May 1/57

SHEET 5-1

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| | REFERENCE NO. | COMP. NO. | WEIGHT | H. ARM | V. ARM | H. MOMENT | V. MOMENT |
|---|---|---|---|---|---|---|---|
| | 1000000 | | | | | | |
| | 1010000 | | | | | | |
| | 101000164 | | 929107064 | 6135997 | | 656371199 | 126329973 |
| S | 101000264 | | 24367320 | 7134110 | | 17833323 | 3266668 |
| | 101000364 | | 39258701 | 18136636 | | 275269924 | 5353221 |
| | 101000464 | | 13456695 | 06136650 | | 93527227 | 1836744 |
| | 101000664 | | 37920774 | 09135508 | | 293534493 | 5122234 |
| | 101000764 | | 7626648 | 73138832 | | 49472215 | 1054828 |
| ING | 101000964 | | 1046727 | 91136670 | | 761394 | 142988 |
| IRING | 10100010 | | 3293787 | 26132224 | | 25924447 | 435466 |
| O W | 101001164 | | 870757 | 00138810 | | 658590 | 120147 |
| | | | 198815 | | | 142613312 | 27025269 |
| | 1020000 | | | | | | |
| | 102000174 | | 33600792 | 13135556 | | 26615568 | 4554816 |
| AIL | 102000274 | | 630731 | 39 1381 | | 460776 | 8700 |
| | | | 34230 | | | 27076344 | 4563516 |
| | 1030000082 | | 44900755 | 23142260 | | 339098 27 | 6402740 |
| | 103000 0 | | 1597738 | 10142260 | | 1178746 | 227732 |
| ELEV | 1030001 82 | | 740744 | 50142200 | | 550930 | 105080 |
| | | | 47237 | | | 35639503 | 6735552 |
| | 1040000 | | | | | | |
| | 104000162 | | 33823577 | 82139 84 | | 19543606 | 4729808 |
| | 104000262 | | 11110484 | 28142 60 | | 5380351 | 1584286 |
| | 104000362 | | 15106565 | 70142 80 | | 8545464 | 2157137 |
| | 104000462 | | 5364600 | 98144 15 | | 3223657 | 773221 |
| | 104000562 | | 3666654 | 92144 50 | | 2400937 | 529737 |
| | 104000662 | | 7667703 | 74144 20 | | 5395575 | 1105581 |
| M S | 104000762 | | 1041854 | 98561 43 95 | | 5194247 4 | 1499743 1 |
| R S | 104000862 | | 14979609 | 64145 72 | | 9131798 | 2182740 |
| SPAR | 104000962 | | 32312718 | 47150 20 | | 23215203 | 4853262 |
| W | 104001062 | | 42717725 | 00143 27 | | 30969825 | 6120065 |
| | 10400 11 | | 7065636 | 21138 76 | | 4494824 | 980339 |
| | 104001262 | | 63746661 | 16150 06 | | 42146305 | 9565725 |
| | 104001362 | | 2185506 | 24621 4463 | | 1365107 01 | 3160888 7 |
| S I W | 104001462 | | 5422567 | 93143 30 | | 3079316 | 776973 |
| G | 104001662 | | 5120461 | 2871 44 99 | | 3138139 5 | 7424068 |
| | 104001762 | | 9548 | 2801 6150 | | 4586 6 | 1534 3 |
| | 104001862 | | 10800636 | 83138 35 | | 6877764 | 1494180 |
| I W | 104001962 | | 13812621 | 04137 90 | | 8577804 | 1904675 |
| | 104002062 | | 13100630 | 71137 10 | | 8262301 | 1796010 |

**AVRO AIRCRAFT LTD.**
MALTON, ONT.

# WEIGHT AND C. OF G BY FUNCTIONAL COMPONE

PROJECT C-105 MK 1

| | DESCRIPTION | REFERENCE NO. | COMP. NO. | WEIGHT | |
|---|---|---|---|---|---|
| | TOTAL FUSELAGE GROUP | 3000000 | | | |
| | FUSELAGE BASIC STRUCTURE | 3010000 | | | |
| | RADOME | 301000151 | | 17728 | |
| | RADAR NOSE ACCESS DOORS | 301000251 | | 8002 | |
| | RADAR NOSE STRUCTURE | 301000351 | | 12225 | |
| | SKIN F F | 301000452 | | 10949 | 1 |
| | SKIN C F | 301000554 | | 21048 | 3 |
| | SKIN D B | 301000656 | | 5880 | 5 |
| 3 | SKINS E B | 301000758 | | 17573 | 6 |
| 4 | FORMERS F F | 301001152 | | 10531 | 1 |
| | FORMERS C F | 301001254 | | 27786 | 3 |
| | FORMER D B | 301001356 | | 7457 | 5 |
| | LIGHT FORMERS E B | 301001458 | | 13501 | 6 |
| 13 | HEAVY FORMERS F B | 301001558 | | 21281 | 6 |
| | LOWER LONGERONS F F | 301001652 | | 6846 | 1 |
| | LONGITUDINAL MEMBERS E B | 301001758 | | 1106 | 7 |
| | LONGERON E B | 301001858 | | 6905 | 6 |
| | TOP LONGERONS E B | 301001958 | | 638 | 6 |
| | LOWER SHEAR PANEL | 301002052 | | 2988 | 2 |
| | TOP WING LONGERONS D B | 301002156 | | 498 | 5 |
| | LONGERONS C F | 301002252 | | 53 | 2 |
| | LONGERONS C F | 301002354 | | 13813 | 4 |
| | LONGERONS D B | 301002556 | | 10569 | 5 |
| | ELECTRONICS BAY STRUCTURE | 301002654 | | 3570 | 2 |
| 59 | LONGITUDINAL BEAMS D B | 301002756 | | 6570 | 5 |
| | RADAR ACCESS DOOR C F | 301002854 | | 2108 | 2 |
| 72 | MAIN FRAME AT STN 538 77 | 301002956 | | 5980 | 5 |
| | DIVE BRAKE ACCOM STRUCTURE | 301003056 | | 3634 | 5 |
| 20 | TOP LONGERONS F F | 301003152 | | 18196 | 1 |
| 100 | DUCT C F | 301003254 | | 33286 | 3 |
| | DUCT D B | 301003356 | | 31504 | 5 |
| | CANOPY ARCHES | 301003452 | | 8535 | 2 |
| 4 | ACCESS PANEL STIFFNERS | 301003656 | | 3865 | 5 |
| 66 | NOSE U C SUPPORT STRUCTURE | 301003752 | | 3343 | 2 |
| 3 | CREW BULKHEADS | 301003852 | | 12272 | 2 |
| | EQUIPMENT BAY STRUCTURE | 301003954 | | 6150 | 2 |
| 60 | WINDSCREEN | 301004152 | | 12754 | 1 |
| | SERV ACCESS DOORS AND PNLS | 301004258 | | 6704 | 6 |
| | TORSION BOX E B | 301004358 | | 6042 | 6 |
| | DORSAL FAIRING AIR OUTLET | 301004454 | | 2061 | 2 |
| | INTERMEDIATE FORMERS | 301004558 | | 5165 | 6 |
| | ENGINE ACCESS DOORS | 301004658 | | 14659 | 6 |
| | SEALING MISSILE BAY | 301004754 | | 697 | 3 |
| | MISCELLANEOUS ITEMS C F | 301004854 | | 392 | 3 |
| | ARMAMENT BAY ROOF | 301004954 | | 13216 | 3 |
| | BULKHEAD AT STA 120 | 301005052 | | 3060 | 1 |
| | BULKHEAD AT STA 255 | 301005152 | | 10429 | 2 |
| | BULKHEAD AT STA 485 | 301005254 | | 11129 | 4 |
| | ENGINE TUNNEL E B | 301005458 | | 46764 | 6 |
| | INTEGRAL FUS FUEL TANK | 301005554 | | 20359 | 3 |

# EIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. 7-0400-44 Iss 5

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| | REFERENCE NO. | COMP. NO. | WEIGHT | H. ARM | V. ARM | H. MOMENT | V. MOMENT |
|---|---|---|---|---|---|---|---|
| | 5000000 | | | | | | |
| | 5010000 | | 12524266 | 501119 | 83 | 832875814 | 150078208 |
| | | | 12524266 | | | 832875814 | 150078208 |
| ESS | 5010100 | | 3365 | 631710 | 382 | 2125704 | 349354 |
| | | | 3365 | | | 2125704 | 349354 |
| D B | 502000156 | | 45245 | 78759 | 607 | 2618265 | 434621 |
| E B | 502000258 | | 23030 | 60584 | 10434 | 13952495 | 2402950 |
| | | | 27554 | | | 16570760 | 2837571 |
| | 5030000 | | | | | | |
| | 503000152 | | 14581 | 61291 | 2476 | 235161 | 181900 |
| | 503000254 | | 2643 | 08131 | 1798 | 81346 | 31147 |
| | 503000356 | | 5084 | 99911 | 3459 | 253954 | 68372 |
| | 503000458 | | 10136 | 39821 | 0194 | 648138 | 103265 |
| | | | 3243 | | | 1218599 | 384684 |
| N ENG | 5040000 | | 25965 | 591551 | 0452 | 15359596 | 2713862 |
| | | | 25965 | | | 15359596 | 2713862 |
| | 5050000 | | 70375 | 628011 | 5509 | 3960424 | 809888 |
| | | | 7037 | | | 3960424 | 809888 |
| | 5060000 | | | | | | |
| | 5060001 | | 69007 | 056013 | 4777 | 4868640 | 929913 |
| | 506000256 | | 14655 | 3181 | 37749 | 80764 | 20074 |
| | | | 7046 | | | 4949404 | 949987 |
| ETS | 5070000 | | | | | | |
| ETS | 5070001 | | 14098 | 62634 | 12972 | 8830141 | 1828793 |
| ES | 5070002 | | 5777 | 65785 | 12371 | 3800399 | 714673 |
| | | | 19875 | | | 12630540 | 2543466 |
| | 5080000 | | | | | | |

GHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. 7-0400-44 Iss 5

SHEET 5-9

| | REFERENCE NO. | COMP. NO. | WEIGHT | H. ARM | V. ARM | H. MOMENT | V. MOMENT |
|---|---|---|---|---|---|---|---|
| | 6000000 | | | | | | |
| | 6010000 | | | | | | |
| F | 601000152 | | 8651 | 15807 | 11520 | 1367464 | 996595 |
| F | 601000254 | | 885 | 33920 | 11526 | 300192 | 102005 |
| 8 | 601000356 | | 350 | 48699 | 11880 | 170447 | 41580 |
| N | 601000583 | | 12688 | 78781 | 22176 | 9995733 | 2813691 |
| W | 601000662 | | 408 | 84717 | 51143 | 75 | 29334679 | 5877075 |
| W | 601000764 | | 301 | 88770 | 78135 | 61 | 23268307 | 4093795 |
| A | 6010008 | | 6 | 46709 | 82143 | 38 | 458544 | 92623 |
| | | | 94292 | | | | 64895366 | 140173364 |
| LICS | 6020000 | | | | | | |
| D B | 602000156 | | 26 | 51574 | 43 | 9616 | 1522814 | 254920 |
| E B | 602000258 | | 416 | 50655 | 55111 | 20 | 27303658 | 4631480 |
| R F | 602000359 | | | 48 | 75875 | 10824 | 36420 | 5196 |
| | | | 44349 | | | | 28862892 | 4891596 |
| I W | 605000062 | | 252 | 66703 | 62147 | 14 | 17777663 | 3717639 |
| | | | 25266 | | | | 17777663 | 3717639 |
| O W | 606000064 | | 125 | 60740 | 60135 | 79 | 9301936 | 1705522 |
| | | | 12560 | | | | 9301936 | 1705522 |
| | 607000083 | | 548 | 97597 | 72077 | 6 | 4170378 | 1140395 |
| | | | 5489 | | | | 4170378 | 1140395 |

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NON CLASSIFIE

| | REFERENCE NO. | COMP. NO. | WEIGHT | H. ARM | V. ARM | H. MOMENT | V. MOMENT |
|---|---|---|---|---|---|---|---|
| | 708000152 | | 455 | 169 | 13128 | 769 | 585 |
| | 708000559 | | 56 | 598 | 20941 | 4645 | 8169 |
| | 708000662 | | 124 | 620 | 22145 | 769 | 179 |
| | | | 6238 | | | 4799560 | 893524 |
| | 7090000 | | | | | | |
| | 7091400 | | | | | | |
| | 709140151 | | 129 | 9285 | 12000 | 11978 | 15480 |
| | 709140252 | | 296 | 6199 | 77112 | 592518 | 332192 |
| | 709140354 | | 130 | 4418 | 78110 | 546089 | 143440 |
| | 709140455 | | 127 | 4219 | 84120 | 280076 | 152880 |
| | 709140556 | | 651 | 5533 | 75 9200 | 3477381 | 599380 |
| | 709140658 | | 6 | 4595 | 00 9200 | 3808 | 588 |
| | 709140862 | | 890 | 9541 | 11139 | 4820749 | 1238351 |
| | 709140983 | | 35 | 2797 | 5430000 | 280734 | 105600 |
| C | 709141091 | | 330 | 1860 | 0 9800 | 61380 | 32340 |
| | 7091411 | | 200 | 2585 | 83100 | 1172832 | 200200 |
| | 7091412 | | 13746 | 3347 | 3 11234 | 46011 | 99 1544226 |
| | | | 37591 | | | 15883016 | 4369977 |
| | 709150052 | | 15248 | 1546 | 4 11095 | 2357951 | 1691766 |
| | | | 15248 | | | 2357951 | 1691766 |
| | 709160054 | | 8709 | 4541 | 5 10760 | 3955192 | 937088 |
| | | | 8709 | | | 3955192 | 937088 |
| | 709170058 | | 670 | 6794 | 4 11597 | 455225 | 77700 |
| | 7091701 | | 116 | 3256 | 2 07 11472 | 6537998 | 1334423 |
| | 7091702 | | 718 | 6135 | 0 12000 | 440493 | 86160 |
| | | | 13020 | | | 7433716 | 1498283 |
| | 709180083 | | 83 | 8955 | 0 28840 | 74327 | 23937 |
| | | | 83 | | | 74327 | 23937 |
| | 709190062 | | 2336 | 6205 | 3 14500 | 1449558 | 338720 |
| | 7091901 | | 112 | 6294 | 6 13561 | 70500 | 15188 |
| | 709190292 | | 74 | 5160 | 0 13700 | 38184 | 10138 |
| | | | 2522 | | | 1558242 | 364046 |
| | 709200055 | | 5090 | 2205 | 9 13832 | 1122803 | 704049 |
| | | | 5090 | | | 1122803 | 704049 |
| | 709210056 | | 26989 | 5185 | 5 10253 | 13995146 | 2767182 |
| | | | 26989 | | | 13995146 | 2767182 |

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# WEIGHT AND C. OF G BY FUNCTIONAL COMPONE

PROJECT C-105 MK 1

| DESCRIPTION | REFERENCE NO. | COMP. NO. | WEIGHT | H |
|---|---|---|---|---|
| SURFACE FINISH C F | 7190003 | 54 | 14003 | |
| SURFACE FINISH 2NTAKES | 7190004 | 55 | 408 | 22 |
| SURFACE FINISH D B | 7190005 | 56 | 377 | 51 |
| SURFACE FINISH E B | 7190006 | 58 | 443 | 6 |
| SURFACE FINISH R F | 7190007 | 59 | 648 | 8 |
| SURFACE FINISH I W | 7190008 | 62 | 3151 | 6 |
| SURFACE FINISH O W | 7190009 | 64 | 1067 | 7 |
| SURFACE FINISH O W L EDGE | 7190010 | 65 | 319 | 6 |
| SURFACE FINISH AILERON | 7190011 | 74 | 353 | 7 |
| SURFACE FINISH ELEVATOR | 7190012 | 82 | 566 | 7 |
| SURFACE FINISH FIN | 7190013 | 83 | 639 | 7 |
| SURFACE FINISH RUDDER | 7190014 | 84 | 202 | 8 |
| | | | 10000 | |
| FLIGT TEST INSTALLATION | 7200000 | | 71050 | 57 |
| | | | 71050 | |

IGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. 7-0400-44 Iss 5

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| | REFERENCE NO. | COMP. NO. | WEIGHT | H. ARM | V. ARM | H. MOMENT | V. MOMENT |
|---|---|---|---|---|---|---|---|
| | 9000000 | | | | | | |
| | 9010000 | 52 | 43000 | 19400 | 13650 | 8342000 | 5869500 |
| | | | 43000 | | | 8342000 | 5869500 |
| | 9020000 | | | | | | |
| | 9020001 | | 88166 | 12461 | 21186 | 5399447 | 1074318 |
| G | 9020002 | | 17736 | 26761 | 11640 | 1111245 | 206377 |
| 3 | 9020003 | 56 | 19255 | 80849 | 9555 | 1118117 | 183934 |
| 3 | 9020004 | 58 | 9095 | 99928 | 9704 | 544746 | 88209 |
| | | | 13423 | | | 8173555 | 1552838 |
| | 9040000 | | | | | | |
| | 9040001 | 52 | 7 | 22049 | 3132 | 00 14755 | 9504 |
| | 9040002 | 54 | 1267 | 26280 | 16150 | 332968 | 204621 |
| | | | 1339 | | | 347723 | 214125 |
| ICING | 9050000 | 51 | 2200 | 9300 | 13800 | 204600 | 303600 |
| | | | 2200 | | | 204600 | 303600 |
| | 9060000 | | 2500 | 73000 | 12900 | 1825000 | 322500 |
| | | | 2500 | | | 1825000 | 322500 |
| | 9070000 | | | | | | |
| | 9070001 | 54 | 4680 | 39424 | 12300 | 1845043 | 575640 |
| | 9070002 | 62 | 17160 | 59755 | 13705 | 10253958 | 2351778 |
| | | | 21840 | | | 12099001 | 2927418 |
| ONING | 9100000 | 54 | 12500 | 26800 | 13200 | 3350000 | 1650000 |
| | | | 12500 | | | 3350000 | 1650000 |

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