

QCX
Avro
CF105
R-7-0400-64
Iss-2

FILE IN VAULT

Arrow 1 Report: 7-0400-64
A/C 25202 & 25203 Issue : 2

SECRET

WEIGHT & C.G. SUMMARY

1 June/58

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DATE

JAN 07 1993

Report no.: QCX-AVRO-CF105-R-7-0400-64-Iss. 2

has been downgraded to : _____

de-classified

by (Name): Michel W. Drapeau

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

Date: Dec. 7, 1992

R. Auger
Signature

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AVRO AIRCRAFT LIMITED
INTER-DEPARTMENTAL MEMORANDUM

Ref: 9600/11/J
Date: 1 June, 1958
To: See Distribution
From: E.F. Burnett
Subject: ARROW 1 A/Cs 25202 and 25203 - Weight and Balance

Attached is a copy of Weight and C.G. Summary, Report 7-0400-64 Issue 2, dated June 1, 1958, for your retention.

This report supercedes Report 7-0400-44 Weight and C.G. Summary ARROW 1 "25201 which is now covered by Weight Statements for Flight Test".

Classification cancelled / changed to: UNCLASSIFIED

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



E.F. Burnett
Weight Supervisor

EFB/ag

| | | | |
|-------------|--------------|----------------|---------------|
| cc: Messrs. | J.C. Floyd | J.P. Booth | J. Zurakowski |
| | R.N. Lindley | F. Brane | A. Crust |
| | R. Marshall | W. Czerwinski | (6 copies for |
| | C.V. Lindow | J. Lucas | R.C.A.F.) |
| | J.W. Ames | S. Kwiatkowski | D. Inglis |
| | B.C. Alford | A. Cornish | D. Moore |
| | D. Wade | T. Roberts | R. Cairns |
| | D.N. Scard | C. Marshall | R. Brownridge |



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Aircraft: ARROW 1
A/C 25202 & 25203
Date: 1 June, 1958

Report: 7-0400-64
Issue : 2

I N D E X

| <u>Sheet</u> | <u>Content</u> |
|--------------|---|
| 1-1 to 1-4 | Introductory notes and explanations of Weight changes. |
| 2-1 to 2-2 | Weight and C.G. Summary |
| 3 | Horizontal C.G. Envelopes for Flight conditions with fuel proportioners used. |
| 4-1 to 4-15 | I.B.M. Detail sheets of Weight and C.G.s |

N.B.

Work has been cancelled on the fuel C.G. management system for Arrow 1 aircraft due to the satisfactory functioning of the proportioners.

Aircraft: ARROW 1
A/C 25202 & 25203
Date: 1 June, 1958

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Sheet: 1-1

INTRODUCTION & WEIGHT CHANGES

The following is a weight & C.G. summary for the second and third Arrow 1 Aircraft Nos. 25202 & 25203, with J75P5 Engines, based on the latest information available. All weight and C.G. changes are quoted relative to 7-0400-64 Issue 1 of May 1st, 1956.

NOTE:

- 1) This summary will not apply for A/C 25204 and 25205 which are to be used for full Astra I Trial installations.
- 2) After Phase I of the flight test programme A/C 25203 will be fitted with a weapons pack trial installation, in lieu of the instrument package installed here.
- 3) In this summary the Aircraft is ballasted such that the aft. C.G. shall not exceed 31% M.A.C. - which is the theoretical aft limit.

GENERAL:

- a) Pratt and Whitney J75 P5 Engines comprise the Power Plant for A/C's 25202 and 25203. (5850 lb each, Pratt and Whitneys latest brochure weight with their installation kit, confirmed by P & W actual weight recorded in engine inspection records).
- b) The Instrument Package containing Flight Instrumentation is installed. The Packages for A/C's 25201 to 25203 differ from those for A/C's 25204 and 25205.

The weight recorded here is Flight Test Department's estimate of cable and instruments. An actual weight will be obtained as soon as a complete pack is available.

For early flights the package will not have complete instrumentation, but ballast will be installed to exactly simulate the completed weight and C.G.

A relatively detailed estimate of other proposed Flight Test Installations throughout the Aircraft has been made. These installations amount to 1457 lb (figure partially confirmed by actual weights of some cable assys).

- c) In A/C 25201 Emergency Fire Protection, landing gear lowering etc. were installed. These are no longer necessary in A/C's 25202 and 25203 and have been deleted from the weight records.
- d) An Interim Radio & Radar System with Minneapolis-Honeywell MH64 Damping System is installed. Currently there is no Doppler or Tacan installation, though space provision for future installation of Doppler, which is not yet available, is made.

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 A/C 25202 & 25203
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GENERAL: Cont'd

- e) The Mk 1A Tailcones and Stinger are fitted. Actually it is doubtful if these will be available for the initial flights of A/C 25202, however, they will be retrofit as soon as available.
- f) On A/C 25202, the set of control surfaces modified structurally for "buzz damper" installation are fitted. The control boxes are already modified for all Mk. 1 A/C. If it is decided to fit a trial installation of the "buzz damper" system there will be the following additional wt to A/C 25202.....

Buzz Damping Equipment +124 lb

This weight report incorporates the modified surfaces as on A/C 25202, however, if A/C 25203 does not have a "buzz damper" installation then the following changes ensue:-

| | |
|-----------|-------------------|
| Elevators | - 11.07 lb/A/C |
| Ailerons | - 11.68 lb/A/C |
| Rudder | - 8.78 lb |
| | <u>- 31.53 lb</u> |

When the split control surfaces are introduced this will entail a further weight increase, however, details of these amendments to the design are not yet available.

- g) Due to material substitutions and concessions introduced by Planning and Production Departments, there is a structural weight penalty of 72 lb approx. This is all recorded in the structural weight breakdown. No account has been taken of variations on machinings etc. nor of shop repair schemes, since it is impossible to assess these, except where actual weights have been obtained. Major repair schemes e.g. cracked outer skin on Air Intakes have been assessed and recorded.
- h) Several weighings of A/C 25201 have been made and the results obtained show good agreement with the estimated weights for the aircraft. However, at no time has it yet been possible to obtain a dry weight of the complete aircraft.

A considerable number of actual weights of parts and components have been obtained. Structural weights have checked within 0.5% of estimates of sub-assemblies etc. Equipment (most of which is now actual weight) has shown a constant increase averaging about 11% over manufacturer's quotations or initial specification weights (excluding Engines and Gear Boxes). Proceeding the report titles on the I.B.M. Tabulation sheets, will be found a number varying from 0 to 100, this is the percentage of actual weight recorded within the report.

A summary of actual weights obtained so far is as follows:-

| | | | | | |
|--------------|---------|-----------------|---------|-----------|--------|
| Structure | 72.32 % | Power Plant | 5.06 % | Equipment | 26.89% |
| Landing Gear | 99.00 % | Flying Controls | 53.85 % | | |

i.e. 44.01 % of the Basic Weight of A/C 25202.

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GENERAL: Cont'd

- j) The aircraft is ballasted such that the C.G. on a flight envelope (using fuel proportioners) does not travel aft of 31% M.A.C.
- k) No further work is being proceeded with in the fuel management system for Arrow I Aircraft. The fuel proportioners are functioning satisfactorily and it is not considered necessary to fit the fuel sequencing system.

| <u>1. STRUCTURE</u> | <u>WEIGHT lb</u> |
|--|------------------|
| a) <u>Wings</u> | |
| No weight changes | |
| b) <u>Fin & Rudder</u> | |
| No weight changes | |
| c) <u>Fuselage Fwd Sta 255 ins</u> | |
| Air Intakes - outer side skin was in .04 Mg, subsequent to supersonic flight this was found to be cracked. Repair scheme instituted, skin now .04Al, stringer sections changed, backing angles added etc | + 6.42 |
| Crew's Bulkheads - jack retraction bracket now steel was aluminium self aligning bearing | + 1.98 |
| Front Fuselage Increase | + 8.40 |
| d) <u>Centre Fuselage Sta 255 - 485 ins</u> | |
| No weight changes. | |
| e) <u>Duct Bay Sta 485 - 591.65 ins</u> | |
| No weight change. | |
| f) <u>Engine Bay Sta 591.65 - 742.5 ins</u> | |
| No weight change. | |
| g) <u>Rear Fuselage Sta 742.5 ins aft</u> | |
| No weight change. | |
| h) <u>Fuselage Joints</u> | |
| No weight change. | |
| <u>TOTAL STRUCTURAL INCREASE</u> | <u>+ 8.40</u> |

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Aircraft: ARROW 1
A/C 25202 & 25203
Date: 1 June, 1958

| | | |
|----|--|------------------|
| 2. | <u>LANDING GEAR</u> | <u>WEIGHT lb</u> |
| | Main Landing Gear - it has become necessary to fit modified brakes with 1" thick discs. | + <u>52.16</u> |
| | <u>TOTAL LANDING GEAR INCREASE</u> | + <u>52.16</u> |
| 3. | <u>POWER PLANT & SERVICES</u> | |
| | No weight change. | |
| 4. | <u>FLYING CONTROLS GROUP</u> | |
| | No weight change. | |
| 5. | <u>EQUIPMENT GROUP</u> | |
| | Interim Radio & Radar - Incorporation of actual weights of approx. 30% of complete system | + <u>1.34</u> |
| | <u>TOTAL EQUIPMENT GROUP INCREASE</u> | + <u>1.34</u> |

SUMMARY

Weight Change - Aircraft Basic Weight

| | |
|--------------|----------------|
| Structure | + 8.40 |
| Landing Gear | + 52.16 |
| Equipment | + <u>1.34</u> |
| | + <u>61.90</u> |

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

UNBALLASTED CONDITION

| | | |
|----------------|----------------|----------------|
| <u>Issue 1</u> | <u>Issue 2</u> | |
| 47,529.78 | 47,591.68 | + <u>61.90</u> |

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Aircraft: ARROW 1
 A/C 25202 & 25203
 Date: 1 June, 1958

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| DESCRIPTION | WEIGHT lb | H. ARM ins | V. ARM ins | % M.A.C. |
|--|-----------|---------------|---------------|----------|
| Aircraft Basic Weight U/C Up | 46,670.66 | 556.76 | 127.42 | |
| U/C Down | | 558.93 | 123.83 | |
| USEFUL LOAD (less fuel) | 921.02 | 366.58 | 132.34 | |
| Crew | 390.00 | 194.00 | 136.00 | |
| Eng. 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 | 140.00 | 268.00 | 132.00 | |
| Oil | 134.23 | 608.92 | 115.68 | |
| BALLAST | 792.00 | 84.84 | 116.50 | |
| Operational Wt. Empty U/C Up | 48,383.68 | 545.41 | 127.33 | 30.22 |
| U/C Down | | 547.51 | 123.87 | 30.80 |
| Max. Internal Fuel (2508 gals at 7.8 lb/gal) | 19,562.00 | 540.99 | 144.09 | |
| Gross Weight (Max. Int. Fuel) U/C Up | 67,945.68 | 544.14 | 132.16 | 29.87 |
| U/C Down | | 545.63 | 129.69 | 30.28 |

N.B. 1) A/C Datum = 120 ins above an arbitrarily chosen ground line.

2) The above figures are for the aircraft in the BALLASTED condition such that the aft. C.G. on the horizontal C.G. envelope, using fuel proportioners, does not exceed 31% M.A.C. i.e. 303 lb on Former Sta. 68.5 and 489 lb on the Shear Panel.

These figures are theoretical requirements only and are not to be confused with full nose ballast normally installed (1,397 lb total).

HORIZONTAL C.G. ENVELOPE

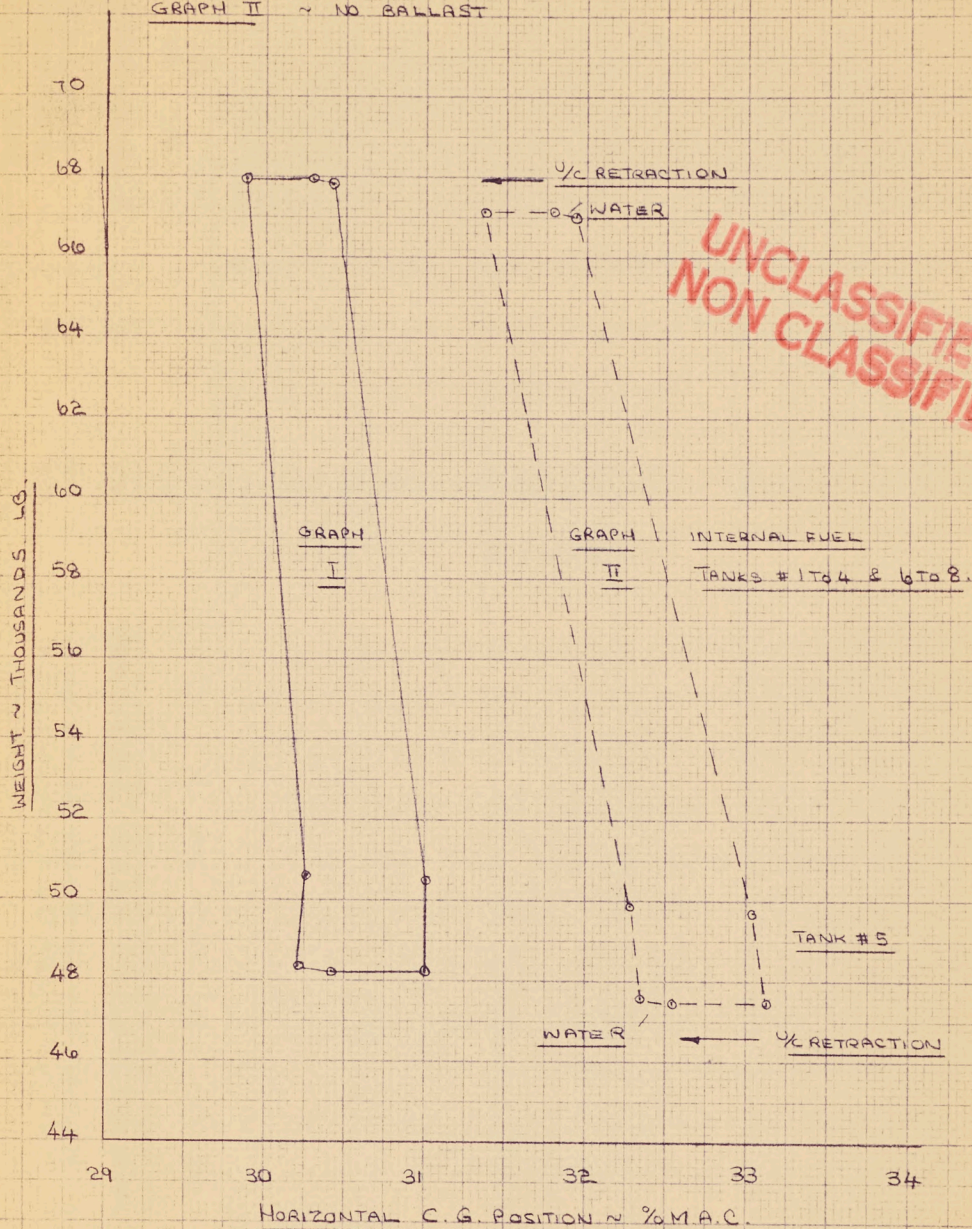
ARROW I ~ $\frac{1}{2}$ BALLASTED & 25202

NORMAL FLIGHT CONDITIONS

FUEL PROPORTIONERS USED

GRAPH I ~ $\frac{1}{2}$ BALLASTED SUCH THAT AFT C.G. DOES NOT EXCEED 31% M.A.C.

GRAPH II ~ NO BALLAST



K&W 10 X 10 TO THE 1/2 INCH 359-12 KEUFFEL & ESSER CO.

PROJECT _____

| DESCRIPTION | REFERENCE NO. | COMP. NO. | WEIGHT | H. |
|--------------------------------|---------------|-----------|----------|----|
| TOTAL WING GROUP | 1000000 | | | |
| OUTER WING | 1010000 | | | |
| 100 OUTER WING SKINS | 1010001 | 64 | 9291070 | |
| 100 POSTS AND INTERCOSTALS | 1010002 | 64 | 243673 | |
| 100 OUTER WING SPARS | 1010003 | 64 | 3925870 | |
| 100 OUTER WING RIBS | 1010004 | 64 | 1345669 | |
| 98 AILERON CONTROL BOX | 1010006 | 64 | 3753077 | |
| 100 RIB 12 | 1010007 | 64 | 762664 | |
| 100 O W AILERON JACK FITTING | 1010009 | 64 | 104672 | |
| AILERON JOINTS AND FAIRING | 1010010 | | 329378 | |
| BUZZ DAMP STRUC PROV O W | 1010011 | 64 | 80075 | |
| | | | 198355 | |
| 96 AILERON | 1020000 | 74 | 3538079 | |
| | | | 35380 | |
| 95 ELEVATOR | 1030000 | 82 | 4600775 | |
| 95 ELEVATOR MARRY UP | 1030001 | | 159773 | |
| | | | 47604 | |
| INNER WING | 1040000 | | | |
| 96 MAIN U C STRUCTURE | 1040001 | 62 | 3307157 | |
| 100 FRONT SPAR I W | 1040002 | 62 | 1111048 | |
| 100 MAIN SPAR I W | 1040003 | 62 | 1510656 | |
| 100 FWD CENTRE SPAR I W | 1040004 | 62 | 536460 | |
| 100 AFT CENTRE SPAR I W | 1040005 | 62 | 366665 | |
| 100 REAR SPAR I W | 1040006 | 62 | 766770 | |
| 100 I W STRUCTURE F S TO M S | 1040007 | 62 | 10690449 | |
| 100 STRUCTURE MS TO R S | 1040008 | 62 | 1497960 | |
| 100 STRUCTURE AFT OF REAR SPAR | 1040009 | 62 | 3221271 | |
| 40 ELEVATOR CONTROL BOX | 1040010 | 62 | 4283872 | |
| 25 TRANSP JOINT MARRY UP | 1040011 | | 706563 | |
| 100 INNER WING JOINTS | 1040012 | 62 | 6347166 | |
| 100 SKINS M S TO R S | 1040013 | 62 | 21903862 | |
| 100 STRUT PICK UP FITTINGS | 1040014 | 62 | 539156 | |
| 100 RIBS 1 TO 9 INNER WING | 1040016 | 62 | 5120461 | |
| 74 DORSAL FAIRING I W | 1040017 | 62 | 9548 | |
| 100 RIB 10 | 1040018 | 62 | 1080063 | |
| 77 WING TO FUS JOINT I W | 1040019 | 62 | 1262861 | |
| 65 TRANSPORT JOINT O W TO I W | 1040020 | 62 | 1294263 | |
| 77 WING TO FUS JOINT C A | 1040021 | | 381852 | |
| BUZZ DAMP STRUC PROV I W | 1040022 | 62 | 55274 | |
| 74 DORSAL FAIRING C A | 1040023 | | 603357 | |
| | | | 665954 | |

EIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. 7-0400-64
Issue 2

SHEET

| | REFERENCE NO. | COMP. NO. | WEIGHT | H. ARM | V. ARM | H. MOMENT | V. MOMENT |
|-------|---------------|-----------|--------|--------|--------|-----------|-----------|
| | 1000000 | | | | | | |
| | 1010000 | | | | | | |
| | 1010001 | 64 | 92910 | 70646 | 13597 | 65637199 | 12632973 |
| S | 1010002 | 64 | 2436 | 73207 | 13410 | 1783323 | 326668 |
| | 1010003 | 64 | 39258 | 70118 | 13636 | 27526924 | 5353221 |
| | 1010004 | 64 | 13456 | 69506 | 13650 | 9352727 | 1836744 |
| | 1010006 | 64 | 37530 | 77409 | 13508 | 29051598 | 5069552 |
| | 1010007 | 64 | 7626 | 64873 | 13832 | 4947215 | 1054828 |
| ING | 1010009 | 64 | 1046 | 72791 | 13670 | 761394 | 142988 |
| IRING | 1010010 | | 3293 | 78726 | 13224 | 2592447 | 435466 |
| O W | 1010011 | 64 | 800 | 75828 | 13680 | 606624 | 109440 |
| | | | 198355 | | | 142259451 | 26961880 |
| | 1020000 | 74 | 35380 | 79190 | 13561 | 28017422 | 4797882 |
| | | | 35380 | | | 28017422 | 4797882 |
| | 1030000 | 82 | 46007 | 75511 | 14256 | 34740346 | 6558758 |
| | 1030001 | | 1597 | 73810 | 14260 | 1178746 | 227732 |
| | | | 47604 | | | 35919092 | 6786490 |
| | 1040000 | | | | | | |
| | 1040001 | 62 | 33071 | 57757 | 13983 | 19100817 | 4624318 |
| | 1040002 | 62 | 11110 | 48428 | 14260 | 5380351 | 1584286 |
| | 1040003 | 62 | 15106 | 56570 | 14280 | 8545464 | 2157137 |
| | 1040004 | 62 | 5364 | 60098 | 14415 | 3223657 | 773221 |
| | 1040005 | 62 | 3666 | 65492 | 14450 | 2400937 | 529737 |
| | 1040006 | 62 | 7667 | 70374 | 14420 | 5395575 | 1105581 |
| M S | 1040007 | 62 | 106904 | 49973 | 14403 | 53423136 | 15397383 |
| | 1040008 | 62 | 14979 | 60964 | 14572 | 9131798 | 2182740 |
| SPAR | 1040009 | 62 | 32212 | 71829 | 15020 | 23137557 | 4838242 |
| | 1040010 | 62 | 42838 | 72470 | 14328 | 31044699 | 6137829 |
| | 1040011 | | 7065 | 63621 | 13876 | 4494824 | 980339 |
| | 1040012 | 62 | 63471 | 66222 | 15046 | 42031766 | 9549847 |
| | 1040013 | 62 | 219038 | 62446 | 14464 | 136780469 | 31681656 |
| S | 1040014 | 62 | 5391 | 56766 | 14330 | 3060255 | 772530 |
| G | 1040016 | 62 | 51204 | 61287 | 14499 | 31381395 | 7424068 |
| | 1040017 | 62 | 95 | 48280 | 16150 | 45866 | 15343 |
| | 1040018 | 62 | 10800 | 63683 | 13835 | 6877764 | 1494180 |
| | 1040019 | 62 | 12628 | 61681 | 13811 | 7789077 | 1744053 |
| O I W | 1040020 | 62 | 12942 | 63071 | 13710 | 8162649 | 1774348 |
| | 1040021 | | 3818 | 52984 | 14301 | 2022929 | 546012 |
| I W | 1040022 | 62 | 552 | 74150 | 14200 | 409308 | 78384 |
| | 1040023 | | 6033 | 57025 | 16034 | 3440318 | 967331 |
| | | | 665954 | | | 407280611 | 96358565 |

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AVRO AIRCRAFT LTD.
MALTON, ONT.

WEIGHT AND C. OF G BY FUNCTIONAL COMPONENT

PROJECT _____

| DESCRIPTION | | REFERENCE NO. | COMP. NO. | WEIGHT |
|----------------------|----------------------------|---------------|-----------|--------|
| TOTAL FUSELAGE GROUP | | 3000000 | | |
| | FUSELAGE BASIC STRUCTURE | 3010000 | | |
| 100 | RADOME | 3010001 | 51 | 18100 |
| 100 | RADAR NOSE ACCESS DOORS | 3010002 | 51 | 8008 |
| | NOSE STRUCTURE FWD STA 120 | 3010003 | 51 | 12207 |
| | SKIN F F | 3010004 | 52 | 110541 |
| 88 | SKIN C F | 3010005 | 54 | 212631 |
| | SKIN D B | 3010006 | 56 | 59375 |
| 3 | SKIN E B | 3010007 | 58 | 177256 |
| | FORMERS F F | 3010011 | 52 | 107171 |
| 100 | FORMERS C F | 3010012 | 54 | 278241 |
| | FORMERS D B | 3010013 | 56 | 74915 |
| | LIGHT FORMERS E B | 3010014 | 58 | 135016 |
| 72 | HEAVY FORMERS E B | 3010015 | 58 | 218906 |
| | LOWER LONGERONS F F | 3010016 | 52 | 69691 |
| | LONGITUDINAL MEMBERS E B | 3010017 | 58 | 11067 |
| 75 | LOWER LONGERON E B | 3010018 | 58 | 68426 |
| | TOP LONGERONS E B | 3010019 | 58 | 6386 |
| | LOWER SHEAR PANEL F F | 3010020 | 52 | 29522 |
| | TOP WING LONGERONS D B | 3010021 | 56 | 4985 |
| 66 | LONGERONS C F | 3010023 | 54 | 144534 |
| 43 | LONGERONS F D B | 3010024 | 54 | 12584 |
| 43 | LONGERONS A D B | 3010025 | 56 | 86555 |
| | ELECTRONICS BAY STRUCTURE | 3010026 | 54 | 35702 |
| 59 | LONGITUDINAL BEAMS D B | 3010027 | 56 | 65705 |
| | RADAR ACCESS DOOR C F | 3010028 | 54 | 21602 |
| 72 | MAIN FRAME AT STN 538 77 | 3010029 | 56 | 59805 |
| | DIVE BRAKE ACCOMMODATIONS | 3010030 | 56 | 36205 |
| 48 | TOP LONGERONS F F | 3010031 | 52 | 192531 |
| 100 | DUCT C F | 3010032 | 54 | 334753 |
| 97 | DUCT D B | 3010033 | 56 | 316635 |
| 22 | CANOPY ARCH | 3010034 | 52 | 86592 |
| 4 | ACCESS PANELS D B | 3010036 | 56 | 39645 |
| 66 | NOSE U C SUPPORT STRUCTURE | 3010037 | 52 | 33432 |
| 3 | CREWS BULKHEADS | 3010038 | 52 | 131012 |
| 51 | EQUIPMENT BAY STRUCTURE | 3010039 | 54 | 62112 |
| 86 | WINDSCREEN | 3010041 | 52 | 130571 |
| 33 | SERVICE ACCESS DOORS | 3010042 | 58 | 67046 |
| | TORSION BOX E B | 3010043 | 58 | 60466 |
| | DORSAL FAIRING AIR OUTLET | 3010044 | 54 | 21432 |
| 66 | INTERMEDIATE FORMERS | 3010045 | 58 | 51546 |
| 3 | ENGINE ACCESS DOORS | 3010046 | 58 | 147396 |
| | SEALING MISSILE BAY | 3010047 | 54 | 7433 |
| 100 | MISCELLANEOUS ITEM C F | 3010048 | 54 | 3923 |
| 98 | ARMAMENT BAY ROOF | 3010049 | 54 | 133263 |
| | BULKHEAD AT STA 120 | 3010050 | 52 | 31441 |
| | BULKHEAD STA 255 | 3010051 | 52 | 104732 |
| 100 | BULKHEAD STA 485 | 3010052 | 54 | 112544 |
| | ENGINE TUNNEL | 3010054 | 58 | 479266 |
| 100 | INTEGRAL FUS FUEL TANK CF | 3010055 | 54 | 211683 |

EIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. _____

SHEET _____

| | REFERENCE NO. | COMP. NO. | WEIGHT | H. ARM | V. ARM | H. MOMENT | V. MOMENT |
|--------|---------------|-----------|--------|--------|--------|-----------|-----------|
| | 3000000 | | | | | | |
| | | | | | | | |
| ATURE | 3010000 | | | | | | |
| | 3010001 | 51 | 18100 | 3796 | 11037 | 687076 | 1997697 |
| ORS | 3010002 | 51 | 8008 | 9509 | 11450 | 761481 | 916916 |
| TA 120 | 3010003 | 51 | 12207 | 9477 | 11401 | 1156857 | 1391720 |
| | 3010004 | 52 | 11054 | 19058 | 12024 | 2106671 | 1329133 |
| | 3010005 | 54 | 21263 | 37670 | 14300 | 8009772 | 3040609 |
| | 3010006 | 56 | 5937 | 53413 | 11157 | 3171130 | 662391 |
| | 3010007 | 58 | 17725 | 66945 | 10996 | 11866001 | 1949041 |
| | 3010011 | 52 | 10717 | 18294 | 12036 | 1960568 | 1289898 |
| | 3010012 | 54 | 27824 | 37482 | 13306 | 10428992 | 3702261 |
| | 3010013 | 56 | 7491 | 53710 | 11316 | 4023416 | 847682 |
| | 3010014 | 58 | 13501 | 66827 | 11119 | 9022313 | 1501176 |
| | 3010015 | 58 | 21890 | 66217 | 10984 | 14494901 | 2404398 |
| | 3010016 | 52 | 6969 | 18483 | 9044 | 1288080 | 630276 |
| E B | 3010017 | 58 | 1106 | 70853 | 9611 | 783634 | 106298 |
| | 3010018 | 58 | 6842 | 65810 | 9781 | 4502720 | 669216 |
| | 3010019 | 58 | 638 | 66605 | 13911 | 424940 | 88752 |
| | 3010020 | 52 | 2952 | 23414 | 8900 | 691181 | 262728 |
| B | 3010021 | 56 | 498 | 53899 | 13550 | 268417 | 67479 |
| | 3010023 | 54 | 1445 | 341038 | 12144 | 5931222 | 1755172 |
| | 3010024 | 54 | 1258 | 48717 | 10700 | 612860 | 134606 |
| | 3010025 | 56 | 8655 | 52931 | 9759 | 4581178 | 844641 |
| CTURE | 3010026 | 54 | 3570 | 27359 | 9197 | 976716 | 328333 |
| B | 3010027 | 56 | 6570 | 52007 | 9125 | 3416860 | 599513 |
| | 3010028 | 54 | 2160 | 27400 | 8976 | 591840 | 193882 |
| B 77 | 3010029 | 56 | 5980 | 53877 | 10383 | 3221845 | 620903 |
| TIONS | 3010030 | 56 | 3620 | 50328 | 9339 | 1821874 | 338072 |
| | 3010031 | 52 | 1925 | 319308 | 14763 | 3717369 | 2842320 |
| | 3010032 | 54 | 3347 | 537249 | 12917 | 12469103 | 4323966 |
| | 3010033 | 56 | 3166 | 354471 | 11812 | 17247153 | 3740034 |
| | 3010034 | 52 | 8659 | 22804 | 16053 | 1974598 | 1390029 |
| | 3010036 | 56 | 3964 | 54013 | 10340 | 2141075 | 409878 |
| UCTURE | 3010037 | 52 | 3343 | 21049 | 9186 | 703668 | 307088 |
| | 3010038 | 52 | 1310 | 120619 | 12291 | 2701295 | 1610244 |
| URE | 3010039 | 54 | 6211 | 28362 | 13736 | 1761564 | 853143 |
| | 3010041 | 52 | 1305 | 713814 | 15006 | 1803694 | 1959333 |
| | 3010042 | 58 | 6704 | 66397 | 9189 | 4451255 | 616031 |
| | 3010043 | 58 | 6046 | 61926 | 9058 | 3744046 | 547647 |
| UTLET | 3010044 | 54 | 2143 | 29245 | 16400 | 626720 | 351452 |
| | 3010045 | 58 | 5154 | 69289 | 10257 | 3571155 | 528646 |
| | 3010046 | 58 | 1473 | 962867 | 8874 | 9265967 | 1307939 |
| | 3010047 | 54 | 743 | 31991 | 10964 | 237693 | 81463 |
| F | 3010048 | 54 | 392 | 37000 | 12500 | 145040 | 49000 |
| | 3010049 | 54 | 1332 | 638460 | 11427 | 5125180 | 1522762 |
| | 3010050 | 52 | 3144 | 12000 | 12280 | 377280 | 386083 |
| | 3010051 | 52 | 1047 | 325500 | 12033 | 2670615 | 1260216 |
| | 3010052 | 54 | 1125 | 48500 | 10530 | 5458190 | 1185046 |
| | 3010054 | 58 | 4792 | 66524 | 11574 | 31882292 | 5546955 |
| NK CF | 3010055 | 54 | 2116 | 39722 | 14553 | 8408353 | 3080579 |

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NON CLASSIFIED

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MALTON, ONT.

WEIGHT AND C. OF G BY FUNCTIONAL COMPONE

PROJECT _____

| DESCRIPTION | REFERENCE NO. | COMP. NO. | WEIGHT | H. |
|--------------------------------|---------------|-----------|--------|-----|
| COCKPIT FLOOR | 3010056 | 52 | 6160 | 17 |
| CENTRE BEAM 697 28 717 36 | 3010059 | 58 | 5577 | |
| DORSAL OVER FUEL TANK | 3010061 | 54 | 5007 | 41 |
| SHIELD EXHAUST DEFLECTOR | 3010062 | 54 | 1981 | 33 |
| SHEAR PANEL BELOW NAV ARCH | 3010063 | 52 | 2115 | 25 |
| 33 PACK MOUNTING STRUCTURE | 3010064 | 54 | 2119 | 29 |
| 88 ENG ACCESS DOORS R F | 3010065 | 59 | 8457 | 77 |
| 99 TUNNEL FIXED R F | 3010066 | 59 | 1040 | 377 |
| 100 SKIN AND STIFFENERS R F | 3010067 | 59 | 5143 | 77 |
| 100 FAIRING UNDER RUDDER R F | 3010068 | 59 | 2616 | 78 |
| 100 FORMERS FIXED R F | 3010069 | 59 | 9001 | 77 |
| 100 LONGERONS C BEAM FIXED R F | 3010070 | 59 | 2799 | 77 |
| TAILCONES | 3010071 | 59 | 4398 | 483 |
| CNTR STRUCT STING REM R F | 3010072 | 59 | 8835 | 83 |
| MISCELLANEOUS ITEMS E B | 3010073 | 58 | 9196 | 66 |
| MTG BRKTS SIDE PANEL D B | 3010075 | 56 | 2435 | 52 |
| FORMERS LOWER PANEL D B | 3010076 | 56 | 7640 | 54 |
| LOWER PANEL D B | 3010077 | 56 | 5348 | 55 |
| JOINT F F TO C F | 3010078 | | 8552 | 25 |
| JOINT AIR INTAKES TO F F | 3010079 | | 1092 | 22 |
| JOINT C F TO D B | 3010080 | | 5204 | 48 |
| JOINT D B TO E B | 3010081 | | 2521 | 58 |
| FUS JOINT AT STA 742 50 | 3010082 | | 4437 | 74 |
| 6 MISCELLANEOUS ITEMS F F | 3010086 | 52 | 850 | 19 |
| | | | 6465 | 34 |
| DIVE BRAKES | 3020000 | 72 | 1179 | 050 |
| DIVE BRAKES C A | 3020001 | | 406 | 48 |
| | | | 121 | 96 |
| AIR INTAKES | 3030000 | | | |
| 7 AIR INTAKES | 3030100 | 55 | 7724 | 821 |
| | | | 7724 | 8 |
| PILOTS AND NAVIG CANOPIES | 3040000 | | | |
| 76 PILOTS CANOPY | 3040100 | 53 | 2420 | 817 |
| | | | 2420 | 8 |
| 100 NAVIGATORS CANOPY | 3040200 | 53 | 1532 | 123 |
| | | | 1532 | 1 |

EIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. _____

SHEET _____

UNCLASSIFIED
NON CLASSIFIED

| | REFERENCE NO. | COMP. NO. | WEIGHT | H. ARM | V. ARM | H. MOMENT | V. MOMENT |
|-------|---------------|-----------|--------|--------|--------|-----------|-----------|
| | 301005652 | | 6160 | 17636 | 11561 | 1086378 | 712158 |
| 17 36 | 301005958 | | 557 | 71367 | 11524 | 397514 | 64189 |
| | 301006154 | | 5007 | 41403 | 14202 | 2073048 | 711094 |
| TOR | 301006254 | | 1981 | 33428 | 16400 | 662209 | 324884 |
| ARCH | 301006352 | | 2115 | 25699 | 15352 | 543534 | 324695 |
| RE | 301006454 | | 2119 | 29285 | 10309 | 620549 | 218448 |
| | 301006559 | | 8457 | 77280 | 9910 | 6535570 | 838089 |
| | 301006659 | | 10403 | 77168 | 13059 | 8027787 | 1358528 |
| F | 301006759 | | 5143 | 77149 | 13796 | 3967773 | 709528 |
| R F | 301006859 | | 2616 | 78134 | 15379 | 2043985 | 402315 |
| | 301006959 | | 9001 | 77929 | 13652 | 7014389 | 1228817 |
| D R F | 301007059 | | 2799 | 77170 | 12570 | 2159988 | 351834 |
| | 301007159 | | 4398 | 483168 | 12877 | 36580613 | 5663820 |
| R F | 301007259 | | 8835 | 83155 | 13729 | 7346744 | 1212957 |
| B | 301007358 | | 919 | 66400 | 10284 | 610216 | 94510 |
| D B | 301007556 | | 243 | 52514 | 13145 | 127609 | 31942 |
| B | 301007656 | | 7640 | 54472 | 9006 | 4161661 | 688058 |
| | 301007756 | | 5348 | 55246 | 8800 | 2954556 | 470624 |
| | 3010078 | | 855 | 25500 | 12000 | 218025 | 102600 |
| F F | 3010079 | | 1092 | 22000 | 12000 | 240240 | 131040 |
| | 3010080 | | 520 | 48500 | 9800 | 252200 | 50960 |
| | 3010081 | | 2521 | 58475 | 9150 | 1474155 | 230672 |
| 50 | 3010082 | | 443 | 74250 | 11500 | 328928 | 50945 |
| F | 301008652 | | 850 | 19050 | 12150 | 161925 | 103275 |
| | | | 646534 | | | 306875446 | 77648629 |
| | 302000072 | | 11790 | 50884 | 9049 | 5999224 | 1066877 |
| | 3020001 | | 406 | 48794 | 9374 | 198104 | 38058 |
| | | | 12196 | | | 6197328 | 1104935 |
| | 3030000 | | | | | | |
| | 303010055 | | 77248 | 21079 | 11868 | 16283106 | 9167793 |
| | | | 77248 | | | 16283106 | 9167793 |
| PIES | 3040000 | | | | | | |
| | 304010053 | | 24208 | 17686 | 15915 | 4281427 | 3852703 |
| | | | 24208 | | | 4281427 | 3852703 |
| | 304020053 | | 15321 | 23277 | 16223 | 3566269 | 2485526 |
| | | | 15321 | | | 3566269 | 2485526 |

WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. _____

SHEET _____

| DESCRIPTION | REFERENCE NO. | | | | COMP. No. | WEIGHT | H. ARM | V. ARM | H. MOMENT | | V. MOMENT | | |
|-------------|---------------|---|---|---|-----------|--------|--------|--------|-----------|-------------|-----------|-----------|----------|
| | | | | | | | | | | | | | |
| POSITION | 4 | 0 | 0 | 0 | 0 | | | | | | | | |
| GROUP | 4 | 0 | 1 | 0 | 0 | | | | | | | | |
| | 4 | 0 | 1 | 0 | 1 | 0 | 0 | 9 | 2 | 20185753899 | 14100 | 108798904 | 28461837 |
| | | | | | | | | | | 201857 | | 108798904 | 28461837 |
| INGS | 4 | 0 | 1 | 0 | 2 | 0 | 0 | 6 | 2 | 2823453760 | 13837 | 15178598 | 3906739 |
| | | | | | | | | | | 28234 | | 15178598 | 3906739 |
| GROUP | 4 | 0 | 2 | 0 | 0 | | | | | | | | |
| | 4 | 0 | 2 | 0 | 1 | 0 | 0 | 9 | 1 | 3338117080 | 9970 | 5701475 | 3328086 |
| | | | | | | | | | | 33381 | | 5701475 | 3328086 |
| IRING | 4 | 0 | 2 | 0 | 2 | 0 | 0 | 5 | 2 | 266716177 | 8825 | 431441 | 235363 |
| | | | | | | | | | | 2667 | | 431441 | 235363 |

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MALTON, ONT.

**WEIGHT AND C. OF G BY FUNCTIONAL
COMPON**

PROJECT _____

| DESCRIPTION | REFERENCE NO. | COMP. NO. | WEIGHT |
|-------------------------------|---------------|-----------|----------|
| ENGINE GROUP | 5000000 | | |
| ENGINE J 75 | 5010000 | | 11875786 |
| | | | 1187578 |
| J 75 ENGINE SERV ACCESS | 5010100 | | 38036 |
| | | | 3803 |
| ACC GEAR BOXES ON FUS D B | 5020001 | 56 | 44455 |
| ACC GEAR BOXES ON FUS E B | 5020002 | 58 | 232256 |
| | | | 27670 |
| ENGINE CONTROLS | 5030000 | | |
| 35 ENGINE CONTROLS F F | 5030001 | 52 | 15581 |
| 35 ENGINE CONTROLS C F | 5030002 | 54 | 1172 |
| 35 ENGINE CONTROLS E B | 5030004 | 58 | 9466 |
| 35 ENGINE CONTROLS I W | 5030005 | 62 | 6894 |
| 35 ENGINE CONTROLS ENG | 5030006 | | 256 |
| | | | 3335 |
| 83 GEARBOX AND STARTER ON ENG | 5040000 | | 286805 |
| | | | 28680 |
| 91 ENGINE ANTI ICING | 5050000 | | 75615 |
| | | | 7561 |
| FIRE EXT SYSTEM | 5060000 | | |
| FIRE EXTING SYSTEM D B | 5060002 | 56 | 1465 |
| FIRE EXTING SYSTEM E B | 5060003 | 58 | 64077 |
| | | | 6553 |
| ENGINE MTGS AND BRACKETS | 5070000 | | |
| 64 ENG MOUNTING AND BRKTS | 5070001 | | 146536 |
| ENGINE MTGS ACCESSORIES | 5070002 | | 52026 |
| ENGINE MTGS ACCESSORIES CA | 5070003 | | 7666 |
| | | | 20621 |

EIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. _____

SHEET _____

| | REFERENCE NO. | COMP. NO. | WEIGHT | H. ARM | V. ARM | H. MOMENT | V. MOMENT |
|-------|---------------|-----------|---------|--------|--------|-----------|-----------|
| | 5000000 | | | | | | |
| | 5010000 | | 1187578 | 66543 | 11983 | 790250029 | 142307472 |
| | | | 1187578 | | | 790250029 | 142307472 |
| SS | 5010100 | | 3803 | 62941 | 10354 | 2393646 | 393763 |
| | | | 3803 | | | 2393646 | 393763 |
| D B | 5020001 | 56 | 4445 | 57866 | 9765 | 2572144 | 434054 |
| E B | 5020002 | 58 | 23225 | 60850 | 10431 | 14132413 | 2422600 |
| | | | 27670 | | | 16704557 | 2856654 |
| | 5030000 | | | | | | |
| | 5030001 | 52 | 1558 | 16668 | 12431 | 259687 | 193675 |
| | 5030002 | 54 | 1172 | 26800 | 11800 | 31356 | 13806 |
| | 5030004 | 58 | 946 | 63787 | 10081 | 603425 | 95366 |
| | 5030005 | 62 | 689 | 49745 | 13137 | 342743 | 90514 |
| | 5030006 | | 256 | 4137 | 10000 | 16034 | 2500 |
| | | | 3335 | | | 1253245 | 395861 |
| N ENG | 5040000 | | 28680 | 58918 | 10554 | 16897682 | 3026887 |
| | | | 28680 | | | 16897682 | 3026887 |
| | 5050000 | | 7561 | 56269 | 11511 | 4254499 | 870347 |
| | | | 7561 | | | 4254499 | 870347 |
| B | 5060000 | | | | | | |
| B | 5060002 | 56 | 146 | 55318 | 13749 | 80764 | 20074 |
| | 5060003 | 58 | 640 | 77038 | 13414 | 4509311 | 859435 |
| | | | 6553 | | | 4590075 | 879509 |
| ETS | 5070000 | | | | | | |
| S | 5070001 | | 14653 | 62504 | 12935 | 9158711 | 1895366 |
| ES | 5070002 | | 5202 | 66213 | 12248 | 3444400 | 637141 |
| ES CA | 5070003 | | 766 | 64236 | 13192 | 492048 | 101051 |
| | | | 20621 | | | 13095159 | 2633558 |

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NON CLASSIFIED

EIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. _____

SHEET _____

UNCLASSIFIED
NON CLASSIFIED

| REFERENCE NO. | | | | COMP. NO. | WEIGHT | H. ARM | V. ARM | H. MOMENT | V. MOMENT |
|---------------|---|----|--|-----------|--------|--------|----------|-----------|-----------|
| 5080000 | 0 | | | | | | | | |
| 5080000 | 1 | 54 | | 13483 | 40781 | 14085 | 5498502 | 1895081 | |
| 5080000 | 2 | 56 | | 17382 | 53418 | 11311 | 9285117 | 1968078 | |
| 5080000 | 3 | 58 | | 36496 | 66892 | 12493 | 2440889 | 455870 | |
| 5080000 | 4 | 62 | | 54349 | 55563 | 14395 | 30197935 | 7823539 | |
| 5080000 | 5 | | | 1648 | 68563 | 8916 | 1129918 | 146936 | |
| 5080000 | 6 | | | 754 | 61525 | 9658 | 463899 | 72821 | |
| | | | | 91265 | | | 49016260 | 12364325 | |

AVRO AIRCRAFT LTD.
MALTON, ONT.

WEIGHT AND C. OF G BY FUNCTIONAL COMPONENT

PROJECT _____

| DESCRIPTION | | REFERENCE NO. | COMP. NO. | WEIGHT | H. |
|----------------------------|----------------------------|---------------|-----------|--------|------|
| FLYING CONTROLS GROUP | | 6000000 | | | |
| MECHANICAL CONTROLS | | 6010000 | | | |
| 50 | MECHANICAL CONTROLS F F | 6010001 | 52 | 10996 | 16 |
| | MECHANICAL CONTROLS C F | 6010002 | 54 | 1213 | 40 |
| 70 | MECHANICAL CONTROLS FIN | 6010005 | 83 | 12423 | 78 |
| 72 | MECHANICAL CONTROLS I W | 6010006 | 62 | 39748 | 71 |
| 45 | MECHANICAL CONTROLS O W | 6010007 | 64 | 30237 | 77 |
| | MECHANICAL CONTROLS C A | 6010008 | | 646 | 70 |
| | | | | 952 | 63 |
| FLYING CONTROLS HYDRAULICS | | 6020000 | | | |
| 32 | FLYING CONT HYDRAULICS D B | 6020001 | 56 | 3243 | 56 |
| 32 | FLYING CONT HYDRAULICS E B | 6020002 | 58 | 45023 | 65 |
| 32 | FLYING CONT HYDRAULICS R F | 6020003 | 59 | | 4875 |
| 77 | FLYING CONT HYDRAULICS I W | 6020004 | 62 | 27475 | 70 |
| 66 | FLYING CONT HYDRAULICS O W | 6020005 | 64 | 13086 | 74 |
| 63 | FLYING CONT HYDRAULICS FIN | 6020006 | 83 | 5564 | 76 |
| 32 | FLYING CONT HYDRAULICS R N | 6020008 | 51 | 3500 | 11 |
| 32 | FLYING CONT HYDRAULICS F F | 6020009 | 52 | 5595 | 16 |
| 32 | FLYING CONT HYDRAULICS C F | 6020010 | 54 | 1920 | 37 |
| | | | | 1054 | 54 |

EIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. _____

SHEET _____

| | REFERENCE NO. | COMP. NO. | WEIGHT | H. ARM | V. ARM | H. MOMENT | V. MOMENT |
|--------|---------------|-----------|--------|--------|--------|-----------|-----------|
| | 6000000 | | | | | | |
| | 6010000 | | | | | | |
| F | 6010001 | 52 | 10996 | 16316 | 11391 | 1794107 | 1252554 |
| F | 6010002 | 54 | 1213 | 40097 | 11790 | 486377 | 143013 |
| FIN | 6010005 | 83 | 12423 | 78817 | 22159 | 9791436 | 2752813 |
| W | 6010006 | 62 | 39748 | 71845 | 14386 | 28556951 | 5718147 |
| W | 6010007 | 64 | 30237 | 77068 | 13562 | 23303051 | 4100742 |
| A | 6010008 | | 646 | 70982 | 14338 | 458544 | 92623 |
| | | | 95263 | | | 64390466 | 14059892 |
| AULICS | 6020000 | | | | | | |
| S D B | 6020001 | 56 | 3243 | 56610 | 10123 | 1835862 | 328289 |
| S E B | 6020002 | 58 | 45023 | 65129 | 11005 | 29323030 | 4954781 |
| S R F | 6020003 | 59 | 48 | 75875 | 10824 | 36420 | 5196 |
| S I W | 6020004 | 62 | 27475 | 70357 | 14721 | 19330586 | 4044595 |
| S O W | 6020005 | 64 | 13086 | 74031 | 13587 | 9687697 | 1777995 |
| S FIN | 6020006 | 83 | 5564 | 76036 | 20808 | 4230643 | 1157757 |
| S R N | 6020008 | 51 | 3500 | 11309 | 10513 | 395815 | 367955 |
| S F F | 6020009 | 52 | 5595 | 16926 | 11000 | 947010 | 615450 |
| S C F | 6020010 | 54 | 1920 | 37329 | 11000 | 716717 | 211200 |
| | | | 105454 | | | 66503780 | 13463218 |

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MALTON, ONT.

**WEIGHT AND C. OF G BY FUNCTIONAL
COMPON**

PROJECT _____

| DESCRIPTION | REFERENCE NO. | COMP. NO. | WEIGHT | F |
|----------------------------|---------------|-----------|--------|----|
| FIXED EQUIPMENT GROUP | 7000000 | | | |
| INSTRUMENTS | 7010000 | | | |
| INSTRUMENTS F F | 7010001 | 52 | 4407 | 1 |
| NAVIG TABLE AND STOWAGE | 7010004 | 52 | 2002 | 2 |
| | | | 4607 | |
| COCKPIT PRESSURE SEALING | 7020000 | 52 | 500 | 1 |
| | | | 500 | |
| 58 OXYGEN SYSTEM | 7030000 | | | |
| 58 OXYGEN SYSTEM | 7030001 | 52 | 2240 | 2 |
| | | | 2240 | |
| AIR CONDITIONING SYSTEM | 7040000 | | | |
| 54 AIRCONDITIONING F F | 7040001 | 52 | 3549 | |
| 54 AIRCONDITIONING C F | 7040002 | 54 | 4721 | 22 |
| 54 AIRCONDITIONING D B | 7040003 | 56 | 1148 | 5 |
| 54 AIRCONDITIONING C A | 7040005 | | 2736 | 33 |
| 54 AIRCONDITIONING ENG | 7040006 | | 2855 | 6 |
| 54 AIRCONDITIONING I W | 7040007 | 62 | 805 | 5 |
| | | | 82207 | |
| HYDRAULICS MAIN SYSTEM | 7050000 | | | |
| 32 UTILITY HYDRAULICS F F | 7050001 | 52 | 8981 | 2 |
| 29 UTILITY HYDRAULICS C F | 7050002 | 54 | 4578 | 4 |
| 20 UTILITY HYDRAULICS D B | 7050003 | 56 | 2733 | 85 |
| 74 UTILITY HYDRAULICS E B | 7050004 | 58 | 7892 | 6 |
| 24 UTILITY HYDRAULICS I W | 7050005 | 62 | 1351 | 15 |
| 32 UTILITY HYDR NOSE U C | 7050006 | 91 | 2131 | 1 |
| 24 UTILITY HYDR MAIN U C | 7050007 | 92 | 2980 | 5 |
| 15 N W DOOR ACTUATING MECH | 7050010 | | 3359 | 2 |
| | | | 68852 | |
| CABIN INSULATION | 7070000 | 52 | 1431 | 1 |
| | | | 1431 | |
| BRAKE PARACHUTE | 7080000 | | | |
| BRAKE PARACHUTE F F | 7080001 | 52 | 462 | 1 |

EIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. _____

SHEET _____

| | REFERENCE NO. | COMP. NO. | WEIGHT | H. ARM | V. ARM | H. MOMENT | V. MOMENT |
|-----|---------------|-----------|--------|--------|--------|-----------|-----------|
| | 7000000 | | | | | | |
| | 7010000 | | | | | | |
| | 7010001 | 52 | 4407 | 16112 | 13909 | 710056 | 612970 |
| GE | 7010004 | 52 | 2002 | 20000 | 13000 | 44000 | 26000 |
| | | | 4607 | | | 754056 | 638970 |
| ING | 7020000 | 52 | 500 | 18600 | 13000 | 93000 | 65000 |
| | | | 500 | | | 93000 | 65000 |
| | 7030000 | | | | | | |
| | 7030001 | 52 | 2240 | 25282 | 15603 | 566317 | 349507 |
| | | | 2240 | | | 566317 | 349507 |
| EM | 7040000 | | | | | | |
| | 7040001 | 52 | 3549 | 17813 | 11118 | 632183 | 394578 |
| | 7040002 | 54 | 4721 | 29489 | 13515 | 13922347 | 6380702 |
| | 7040003 | 56 | 1148 | 51640 | 12503 | 592827 | 143534 |
| | 7040005 | | 2736 | 39792 | 13613 | 10888285 | 3724925 |
| | 7040006 | | 2855 | 64017 | 13900 | 1827685 | 396845 |
| | 7040007 | 62 | 8051 | 500 | 15950 | 41200 | 12760 |
| | | | 82207 | | | 27904527 | 11053344 |
| M | 7050000 | | | | | | |
| F | 7050001 | 52 | 8981 | 20071 | 10926 | 1802577 | 981264 |
| F | 7050002 | 54 | 4578 | 44016 | 10399 | 2015052 | 476066 |
| B | 7050003 | 56 | 2733 | 85692 | 11077 | 15225079 | 3028230 |
| B | 7050004 | 58 | 7892 | 60587 | 10861 | 4781526 | 857150 |
| W | 7050005 | 62 | 1351 | 15530 | 414234 | 7472123 | 1923156 |
| | 7050006 | 91 | 2131 | 18863 | 9318 | 40178 | 19847 |
| | 7050007 | 92 | 2980 | 54325 | 14100 | 1618885 | 420180 |
| CH | 7050010 | | 3359 | 20256 | 9789 | 680399 | 328813 |
| | | | 68852 | | | 33635819 | 8034706 |
| | 7070000 | | | | | | |
| | 7070000 | 52 | 1431 | 18748 | 13200 | 268284 | 188892 |
| | | | 1431 | | | 268284 | 188892 |
| | 7080000 | | | | | | |
| | 7080001 | 52 | 4621 | 6895 | 12875 | 78055 | 59483 |

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AVRO AIRCRAFT LTD.
MALTON, ONT.

**WEIGHT AND C. OF G BY FUNCTIONAL
COMPONENT**

PROJECT _____

| DESCRIPTION | | REFERENCE NO. | COMP. NO. | WEIGHT | H. |
|-------------|--------------------------|---------------|-----------|--------|-----|
| | BRAKE PARACHUTE R F | 7080005 | 59 | 851382 | |
| | BRAKE PARACHUTE I W | 7080006 | 62 | 12462 | |
| | | | | 9099 | |
| | ELECTRICAL SYSTEM | 7090000 | | | |
| 33 | ELECTRICAL WIRING R N | 7090001 | 51 | 129 | 9 |
| 33 | ELECTRICAL WIRING F F | 7090002 | 52 | 2966 | 19 |
| 33 | ELECTRICAL WIRING C F | 7090003 | 54 | 1304 | 41 |
| 33 | ELECTRICAL WIRING A I | 7090004 | 55 | 1274 | 21 |
| 33 | ELECTRICAL WIRING D B | 7090005 | 56 | 6515 | 53 |
| 33 | ELECTRICAL WIRING E B | 7090006 | 58 | 64 | 59 |
| 33 | ELECTRICAL WIRING I W | 7090008 | 62 | 8909 | 54 |
| 33 | ELECTRICAL WIRING FIN | 7090009 | 83 | 352 | 79 |
| 33 | ELECTRICAL WIRING NUC | 7090010 | 91 | 330 | 18 |
| 33 | ELECTRICAL WIRING ENG | 7090011 | | 2002 | 58 |
| 33 | ELECTRICAL WIRING C A | 7090012 | | 1374 | 33 |
| 65 | ELECTRICS F F | 7090013 | 52 | 1627 | 15 |
| 26 | ELECTRICS C F | 7090014 | 54 | 7596 | 44 |
| 85 | ELECTRICS E B | 7090015 | 58 | 670 | 67 |
| 85 | ELECTRICS ENG | 7090016 | | 1163 | 256 |
| 85 | ELECTRICS C A | 7090017 | | 718 | 61 |
| | ELECTRICS FIN | 7090018 | 83 | 83 | 89 |
| | ELECTRICS I W | 7090019 | 62 | 233 | 62 |
| | ELECTRICS CAW | 7090020 | | 112 | 62 |
| | ELECTRICS MUC | 7090021 | 92 | 74 | 51 |
| 19 | ELECTRICS A I | 7090022 | 55 | 530 | 22 |
| 93 | ELECTRICS D B | 7090023 | 56 | 2713 | 251 |
| | ELECTRICS R F | 7090024 | 59 | 136 | 80 |
| 62 | WINDSCREEN DEMISTING | 7090025 | 52 | 2964 | 19 |
| | | | | 1126 | 18 |
| | L P PNEUMATICS | 7100000 | | | |
| 26 | L P PNEUMATICS F F | 7100001 | 52 | 2060 | 19 |
| 18 | L P PNEUMATICS C F | 7100002 | 54 | 671 | 33 |
| | L P PNEUMATICS D B | 7100003 | 56 | 444 | 55 |
| | L P PNEUMATICS E B | 7100004 | 58 | 1526 | 65 |
| | L P PNEUMATICS FIN | 7100005 | 83 | 640 | 75 |
| | L P PNEUMATICS R N | 7100006 | 51 | 124 | 7 |
| | | | | 54 | 65 |
| | INTAKE DE ICING | 7120000 | 55 | 8800 | 19 |
| | | | | 8800 | |
| 29 | RADIO RADAR INT SYST R N | 7150001 | 51 | 1872 | 9 |
| 29 | RADIO RADAR INT SYST F F | 7150002 | 52 | 8996 | 19 |
| 29 | RADIO RADAR INT SYST C F | 7150003 | 54 | 2343 | 27 |

EIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. _____

SHEET _____

| REFERENCE NO. | | COMP. NO. | WEIGHT | H. ARM | V. ARM | H. MOMENT | V. MOMENT |
|---------------|--------|-----------|------------|--------|--------|-----------|-----------|
| 708000 | 559 | | 851382210 | 14392 | | 6998537 | 1225191 |
| 708000 | 662 | | 12462022 | 14500 | | 76907 | 17980 |
| | | | 9099 | | | 7153499 | 1302654 |
| 709000 | 00 | | | | | | |
| 709000 | 151 | | 129 9285 | 12000 | | 11978 | 15480 |
| 709000 | 252 | | 296619977 | 11200 | | 592518 | 332192 |
| 709000 | 354 | | 130441878 | 11000 | | 546089 | 143440 |
| 709000 | 455 | | 127421984 | 12000 | | 280076 | 152880 |
| 709000 | 556 | | 651553375 | 9200 | | 3477381 | 599380 |
| 709000 | 658 | | 6459500 | 9200 | | 38080 | 5888 |
| 709000 | 862 | | 890954111 | 13900 | | 4820749 | 1238351 |
| 709000 | 983 | | 35279754 | 30000 | | 280734 | 105600 |
| 709000 | 1091 | | 33018600 | 9800 | | 61380 | 32340 |
| 709000 | 11 | | 200258583 | 10000 | | 1172832 | 200200 |
| 709000 | 12 | | 1374633473 | 11234 | | 4601199 | 1544226 |
| 709000 | 1352 | | 1627115582 | 11097 | | 2535347 | 1805593 |
| 709000 | 1454 | | 759644897 | 10870 | | 3410376 | 825685 |
| 709000 | 1558 | | 67067944 | 11597 | | 455225 | 77700 |
| 709000 | 16 | | 1163256207 | 11472 | | 6537998 | 1334423 |
| 709000 | 17 | | 71861350 | 12000 | | 440493 | 86160 |
| 709000 | 1883 | | 8389550 | 28840 | | 74327 | 23937 |
| 709000 | 1962 | | 233662053 | 14500 | | 1449558 | 338720 |
| 709000 | 20 | | 11262946 | 13561 | | 70500 | 15188 |
| 709000 | 2192 | | 7451600 | 13700 | | 38184 | 10138 |
| 709000 | 2255 | | 530322076 | 13833 | | 1170690 | 733564 |
| 709000 | 2356 | | 2713251861 | 10254 | | 14070927 | 2782115 |
| 709000 | 2459 | | 13680200 | 11360 | | 109072 | 15450 |
| 709000 | 2552 | | 296419896 | 9981 | | 589717 | 295837 |
| | | | 112618 | | | 46835430 | 12714487 |
| 710000 | 00 | | | | | | |
| 710000 | 152 | | 206019474 | 12434 | | 401164 | 256140 |
| 710000 | 254 | | 67133431 | 11033 | | 224322 | 74031 |
| 710000 | 356 | | 44455296 | 11859 | | 245514 | 52654 |
| 710000 | 458 | | 152665650 | 9737 | | 1001819 | 148587 |
| 710000 | 583 | | 64075818 | 25515 | | 485235 | 163296 |
| 710000 | 651 | | 124 7431 | 9955 | | 9214 | 12344 |
| | | | 5465 | | | 2367268 | 707052 |
| 712000 | 0055 | | 880019582 | 11800 | | 1723216 | 1038400 |
| | | | 8800 | | | 1723216 | 1038400 |
| R N | 715000 | 151 | 1872 9909 | 9034 | | 185496 | 169116 |
| F F | 715000 | 252 | 899619356 | 12003 | | 1741266 | 1079790 |
| C F | 715000 | 354 | 2343827488 | 10315 | | 6442637 | 2417630 |

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WEIGHT AND C. OF G BY FUNCTIONAL COMPONENTS

PROJECT _____

| DESCRIPTION | | REFERENCE NO. | COMP. NO. | WEIGHT | H. |
|-------------|---------------------------|---------------|-----------|--------|-----|
| 29 | RADIO RADAR INT SYST I W | 71500005 | 62 | 4827 | 57 |
| 29 | RADIO RADAR INT SYST O W | 71500006 | 64 | 1049 | 74 |
| 29 | RADIO RADAR INT SYST FIN | 71500007 | 83 | 3380 | 76 |
| 29 | RADIO RADAR INT SYST C A | 71500008 | | 2129 | 36 |
| 29 | RADIO RADAR INT SYST D B | 71500009 | 59 | 1374 | |
| | | | | 648 | 68 |
| 37 | CANOPY ACTUATION | 71600000 | 52 | 6586 | 22 |
| | | | | 6586 | |
| | CABIN CONSOLES | 71700000 | 52 | 1745 | 17 |
| | | | | 1745 | |
| | SURFACE FINISH F F | 71900001 | 52 | 363 | 18 |
| | SURFACE FINISH CANOPY | 71900002 | 53 | 642 | 20 |
| | SURFACE FINISH C F | 71900003 | 54 | 1400 | 37 |
| | SURFACE FINISH INTAKES | 71900004 | 55 | 408 | 22 |
| | SURFACE FINISH D B | 71900005 | 56 | 377 | 53 |
| | SURFACE FINISH E B | 71900006 | 58 | 443 | 66 |
| | SURFACE FINISH R F | 71900007 | 59 | 648 | 80 |
| | SURFACE FINISH I W | 71900008 | 62 | 315 | 160 |
| | SURFACE FINISH O W | 71900009 | 64 | 1067 | 70 |
| | SURFACE FINISH O W L EDGE | 71900010 | 65 | 319 | 63 |
| | SURFACE FINISH AILERON | 71900011 | 74 | 353 | 79 |
| | SURFACE FINISH ELEVATOR | 71900012 | 82 | 566 | 75 |
| | SURFACE FINISH FIN | 71900013 | 83 | 639 | 74 |
| | SURFACE FINISH RUDDER | 71900014 | 84 | 202 | 81 |
| | | | | 10000 | |
| | FLIGHT TEST INSTALLATION | 72000000 | | 145673 | 48 |
| | | | | 145673 | |

WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. _____

SHEET _____

UNCLASSIFIED
NON CLASSIFIED

| | REFERENCE NO. | | COMP. NO. | WEIGHT | H. ARM | V. ARM | MOMENT | |
|------|---------------|----|-----------|--------|--------|--------|-----------|-----------|
| | | | | | | | H. MOMENT | V. MOMENT |
| I W | 71500005 | 62 | | 4827 | 57199 | 15674 | 2760999 | 756584 |
| O W | 71500006 | 64 | | 1049 | 74642 | 13720 | 782995 | 143923 |
| FIN | 71500007 | 83 | | 3380 | 76179 | 25195 | 2574850 | 851591 |
| C A | 71500008 | | | 21293 | 36192 | 12330 | 7706363 | 2625427 |
| D B | 71500009 | 59 | | 13 | 74550 | 15800 | 9692 | 2054 |
| | | | | 64868 | | | 22204295 | 8046115 |
| | 71600000 | 52 | | 6586 | 22201 | 15436 | 1462158 | 1016615 |
| | | | | 6586 | | | 1462158 | 1016615 |
| | 71700000 | 52 | | 1745 | 17476 | 12434 | 304956 | 216973 |
| | | | | 1745 | | | 304956 | 216973 |
| | 71900001 | 52 | | 363 | 18744 | 12200 | 68041 | 44286 |
| | 71900002 | 53 | | 64 | 20218 | 15900 | 12940 | 10176 |
| | 71900003 | 54 | | 1400 | 37197 | 12455 | 520758 | 174370 |
| ES | 71900004 | 55 | | 408 | 22798 | 12020 | 93016 | 49042 |
| | 71900005 | 56 | | 377 | 53828 | 11200 | 202932 | 42224 |
| | 71900006 | 58 | | 443 | 66701 | 11200 | 295485 | 49616 |
| | 71900007 | 59 | | 648 | 80362 | 13175 | 520746 | 85374 |
| | 71900008 | 62 | | 3151 | 60144 | 14400 | 1895137 | 453744 |
| | 71900009 | 64 | | 1067 | 70650 | 13590 | 753836 | 145005 |
| EDGE | 71900010 | 65 | | 319 | 63948 | 13526 | 203994 | 43148 |
| ON | 71900011 | 74 | | 353 | 79190 | 13556 | 279541 | 47853 |
| TOR | 71900012 | 82 | | 566 | 75523 | 14260 | 427460 | 80712 |
| | 71900013 | 83 | | 639 | 74663 | 20837 | 477097 | 133148 |
| R | 71900014 | 84 | | 202 | 81279 | 21431 | 164184 | 43291 |
| | | | | 10000 | | | 5915167 | 1401989 |
| | 72000000 | | | 145673 | 48848 | 12890 | 71158347 | 18777250 |
| | | | | 145673 | | | 71158347 | 18777250 |

AVRO AIRCRAFT LTD.
MALTON, ONT.

WEIGHT AND C. OF G BY FUNCTIONAL GROUP
COMPONENT

PROJECT _____

| DESCRIPTION | REFERENCE NO. | COMP. NO. | WEIGHT | H. A. |
|---------------------------|---------------|-----------|-----------|-------|
| REMOVABLE EQUIPMENT GROUP | 8000000 | | | |
| 94 EJECTOR SEATS | 801010052 | | 34294204 | |
| | | | 34294 | |
| RADAR REMOV GROUP | 9020000 | | | |
| DAMPING SYSTEM | 8030000 | | | |
| DAMPING SYSTEM F F | 803010152 | | 784172 | |
| DAMPING SYSTEM C F | 903010254 | | 2303322 | |
| DAMPING SYSTEM E B | 803010358 | | 369632 | |
| DAMPING SYSTEM I W | 803010462 | | 6070527 | |
| DAMPING SYSTEM O W | 803010564 | | 95748 | |
| DAMPING SYSTEM R N | 903010651 | | 28773 | |
| | | | 9908 | |
| 98 INSTRUMENT PACK | 805080054 | | 68680385 | |
| | | | 68680 | |
| INSTRUMENTATION | 805090054 | | 304800394 | |
| | | | 304800 | |

WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. _____

SHEET _____

| GROUP | REFERENCE NO. | COMP. NO. | WEIGHT | H. ARM | V. ARM | H. MOMENT | V. MOMENT |
|-------|---------------|-----------|--------|--------|--------|-----------|-----------|
| | 8000000 | | | | | | |
| | 8010100 | 52 | 34294 | 20450 | 13411 | 7013123 | 4599168 |
| | | | 34294 | | | 7013123 | 4599168 |
| | 9020000 | | | | | | |
| | 8030000 | | | | | | |
| | 8030101 | 52 | 784 | 17201 | 12047 | 134856 | 94448 |
| | 9030102 | 54 | 2303 | 32213 | 10949 | 741865 | 252155 |
| | 8030103 | 58 | 369 | 63242 | 13432 | 233363 | 49564 |
| | 8030104 | 62 | 6070 | 52781 | 15720 | 3203807 | 954204 |
| | 8030105 | 64 | 95 | 74855 | 14000 | 71112 | 13300 |
| | 9030106 | 51 | 287 | 7350 | 9340 | 21095 | 26806 |
| | | | 9908 | | | 4406098 | 1390477 |
| | 8050800 | 54 | 68680 | 38581 | 9468 | 26497431 | 6502622 |
| | | | 68680 | | | 26497431 | 6502622 |
| | 8050900 | 54 | 304800 | 39400 | 9500 | 120091200 | 28956000 |
| | | | 304800 | | | 120091200 | 28956000 |

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EIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. _____

SHEET _____

| | REFERENCE NO. | COMP. NO. | WEIGHT | H. ARM | V. ARM | H. MOMENT | V. MOMENT |
|--------|---------------|-----------|--------|--------|--------|-----------|-----------|
| | 9000000 | | | | | | |
| | 9010000 | 52 | 39000 | 19400 | 13650 | 7566000 | 5523500 |
| | | | 39000 | | | 7566000 | 5323500 |
| | 9020000 | | | | | | |
| | 9020001 | | 88166 | 1246 | 12186 | 5399447 | 1074318 |
| | 9020002 | | 17736 | 2676 | 11640 | 1111245 | 206377 |
| NG | 9020003 | 56 | 19255 | 8084 | 9555 | 1118117 | 183934 |
| B | 9020004 | 58 | 9095 | 9928 | 9704 | 544746 | 88209 |
| | | | 13423 | | | 8173555 | 1552838 |
| | 9040000 | | | | | | |
| | 9040001 | 52 | 7220 | 493 | 13200 | 14755 | 9504 |
| | 9040002 | 54 | 1267 | 26280 | 16150 | 332968 | 204621 |
| | | | 1339 | | | 347723 | 214125 |
| | 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 |
| IONING | 9100000 | 54 | 12500 | 26800 | 13200 | 3350000 | 1650000 |
| IRCOND | 9100001 | 54 | 1500 | 26700 | 12700 | 400500 | 190500 |
| | | | 14000 | | | 3750500 | 1840500 |

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