

QCX
Avro
CF105
R-7-0400-34
Iss-8

FILE IN VAULT

C-105 MK 2 Report # 7-0400-34
Production A/C Issue 8 16
WEIGHT SUMMARY & C.O. POSITION
N.A.A. SECRET June 1/57



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DATE

JAN 07 1993

Report no.: QCX - AVRO - CF105- R-7-0400-34-Iss. 8

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

Date: June 1st, 1957
Aircraft: C-105 MK. 2

Report # 7-0400-34 Iss. 8
Prepared By: K. Griffin
Checked By: E. Burnett

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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

I N D E X

<u>Sheet #</u>	<u>Content</u>
1-1 to 1-4	Introductory notes and brief explanation of Weight Changes to the Aircraft.
2-1 to 2-4	Detailed explanation of Weight Changes to weight reports as listed on I.B.M. Sheets.
3-1 to 3-2	Weight and C.G. Summaries.
4-1	Horizontal C.G. Envelope for Aircraft Flight Conditions using fuel sequencing, C.G. controlled to approximately 31% M.A.C. until Damping System requirements proven. (ref. Avro Spec. E-503).
4-2	Horizontal C.G. Envelope for Aircraft Flight Conditions using fuel sequencing to achieve approximately 34% M.A.C. at Combat Weight (Alternate sequencing Spec. E-503).
5-1 to 5-15	I.B.M. Detail Sheets of Weight's and C.G.'s .



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Date: June 1st, 1957
Aircraft: C-105 MK 2
Production A/C

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Report # 7-0400-34 Iss. 8
Sheet # 1-1
Prepared By: K. Griffin
Checked By: E. Burnett

INTRODUCTION

The following is a Weight & C.G. Summary of the C-105 MK 2 Production Aircraft. Of necessity some figures quoted herein are only of a very preliminary nature, due to lack of information e.g. Fuselage aft of Sta. 803, Air-Conditioning system etc, extensive redesign from MK 1 is in progress.

Weight estimates have been made, based on the MK 1 Aircraft with relevant changes made to MK 2 scheme and production drawings. Where no details regarding minor changes are yet available, allowances have been retained as in the MK 1 Aircraft.

All Weight & C.G. changes are relative to Issue 7 of May 1st, 1957.

GENERAL

- a) Orenda PS 13 Engines comprise the Power Plant (4,500 lb each).
- b) A package containing 4 "semi-submerged" Sparrow II Missiles (432 lb each) forms the current armament.
- c) The R.C.A. Radar Astra I System is installed - Weight & C.G. location being to the latest breakdown received from them, dated January 11th, 1957. However, the Sparrow III Auxiliaries and the Infra-red Tracker system, included in the breakdown, have been deleted and some Avro installed antennae added (Total Weight 2,614.5 lb)
- d) A considerable number of MK 1 parts and assemblies have now been weighed. There have only been very insignificant weight deviations between calculated and actual weights of Structural items, however, bought out equipment has been fairly consistently in the order of 11% above the manufacturers estimates or Avro specification weight requirements. Where these weights apply to the MK 2 Aircraft, they have been incorporated into the MK 2 Aircraft weight records.

On the I.B.M. sheets in this report, immediately preceeding the item title, will be found a number varying from 0 to 100. This is the percentage actual weight recorded in that particular report.

N.B. It should be noted that the first MK 2 Aircraft will probably not be as this summary designates, but will be a Flight Test version with instrumentation replacing the Missile Package etc.

1. STRUCTURE

WEIGHT (lb)

- a) Inner Wing - addition of bumper pads
Miscellaneous re-estimates, actual weights of
MK 1 parts etc. etc.

+	5
+	5
+	10

Weight Change Increase
Ref. 2-1

- b) Fin and Rudder

Rudder - Actual weight of MK 1 Rudder

+	3
+	3

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Weight Change Increase
Ref. 2-1

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INTRODUCTION

1. STRUCTURE

WEIGHT (lb)

c) Fuselage Fwd. Sta. 255"

Top Longerons - machined packers Al. replaces Mg.	+	4
Windscreen - actual weight of casting (MK 1 A/C)	+	2
Pilot's Canopy - actual weight of casting and glass (MK 1 A/C)	+	4
Navigator's Canopy - actual weight of casting, window frame and glass (MK 1 A/C)	+	5
Weight Change Increase	+	15
Ref. 2-1		

d) Centre Fuselage Sta. 255"-485"

No Weight Change

e) Duct Bay Sta. 485"-591.65"

No Weight Change

The Floating Duct is being extensively redesigned with an articulated adaptor between floating duct and Engine, to include gills. No drawings are yet released and it is felt that the weight currently recorded together with the adaptor ring (made obsolete by above, but still recorded for weight purposes) will be adequate. A revised estimate will be made at the earliest opportunity.

f) Engine Bay Sta. 591.65"-742.5"

Engine Rails - estimated to production drawings	+	1
Engine Doors # 1 & 2 - first estimate to scheme drawings	-	11
Weight Change Decrease	-	10
Ref. 2-2		

g) Rear Fuselage Sta. 742.5" Aft.

Engine Access Doors - web gauges etc. included in some frames	+	5
Weight Change Increase	+	5
Ref. 2-2		

There is no definite scheme yet for Tailcones and Stringer structure. The weight currently recorded is as for MK 1 in Titanium, allowances having been made for the increased length of the Tailcone, but no other account taken of lines changing or design alterations.

h) Fuselage Joints

No Weight Changes

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TOTAL STRUCTURAL INCREASE

+ 23

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Checked By E. Burnett

INTRODUCTION

2. LANDING GEAR

WEIGHT (lb)

No Weight Change

3. POWER PLANT & SERVICES

Engine Mounts & Accessories - some production drawing estimates, early allowances tended to be too high	-	8
Fuel System - first complete estimate of the redesigned system without proportioners	-	64
<u>TOTAL POWER PLANT & SERVICES DECREASE</u>	-	<u>72</u>
<u>Ref. 2-2</u>		

4. FLYING CONTROLS

Mechanical Controls - design O/B Aileron Control Rod etc.	+	4
Hydraulic Controls - miscellaneous design changes	+	4
<u>TOTAL FLYING CONTROL INCREASE</u>	+	<u>8</u>
<u>Ref. 2-2</u>		

5. EQUIPMENT GROUP

Windscreen De-misting - increase in transformer & panel E 40 controls etc. for Navigator's window de-misting	+	12
Ejector Seats - redesign of Martin Baker 80 ft/sec. ejection seat - manufacturer's weight	+	6
Oxygen System - miscellaneous redesign piping etc.	+	76
Low Pressure - piping for waveguide compressor, hydraulic system and armament pack inflatable seal added	+	2
Utility Hydraulics - 200 cu. ins. accumulator replaces 80 cu ins.	+	6
Missile Pack Structure & mechanisms - estimates generally revised to current data, for fuller information see 'weight changes' section, briefly:-	+	12
Structure - increased by	+	45
Telescopic Links	-	27
Launcher Stops deleted	-	35
Drag Links, attachments etc.	-	3
Missile Pack Hydraulics - addition 40 G.P.M filter	+	12
Vendors weights of jacks & valves	-	30
<u>TOTAL EQUIPMENT INCREASE</u>	+	<u>76</u>
<u>Ref. 3-4</u>		

6. OPERATIONAL LOAD

Water - Trapped in Air Conditioning System - no allowance previously +	+	15
<u>TOTAL OPERATIONAL LOAD INCREASE</u>	+	<u>15</u>
<u>Ref. 2-4</u>		

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INTRODUCTION

SUMMARY

Weight Change - Aircraft Basic Weight

Structure	+	23 lb.
Power Plant	-	72 lb.
Flying Controls	+	8 lb.
Equipment	+	76 lb.
	+	<u>35 lb.</u>

Weight Change - Operational Load less Fuel

Water Trapped	+	15 lb.
---------------	---	--------

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

<u>Issue 7</u>	<u>Issue 8</u>	
<u>44,165 lb</u>	<u>44,215 lb</u>	= <u>+ 50 lb.</u>

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Sheet # 2-1
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DETAILED WEIGHT CHANGES TO I.B.M.
TABULATED DETAILS OF May 1st, 1957.

WEIGHT CHANGES

WEIGHT (lb)

Wing:

- 3.93	A/C Centre Line Joints - revisions in accordance with MK 1 Actual weights of parts etc. Machined rib included in Structure F/S to M/S	+ 2.09
		- 6.02
		- 3.93
+ 17.33	Structure F/S to M/S - Addition of bumper pads C/L rib now included here (see above) Actual weights of MK 1 Skin Panels Miscellaneous minor changes	+ 5.48
		+ 6.02
		+ 5.54
		+ 0.29
		+ 17.33
+ 4.88	Skins M/S to R/S - Actual weight of pump access door calculation was in error.	
- 7.52	Structure for Main U/C - Actual weights of housing and Shaft Fork End.	
- 1.58	Joint O/W to I/W - Incorporation of approximately 25% actual weights	
+ 0.94	I/W Structure Aft R/Spar - Actual weight of Beam # 3 Production drawing estimates rear Engine Mount housing	- 0.36
		+ 1.30
		- 0.94
+ 10.12		

Fin & Rudder

+ 3.30	Rudder - Actual weight of MK 1 Rudder
+ 3.30	

Fuselage Fwd. Sta. 255"

+ 3.75	Top Longeron F.F. - packing which requires machining has been changed from Mg. to Al.	
+ 2.49	Windscreen - Actual weight of casting and some hardware alterations	
+ 3.56	Pilot's Canopy - Actual weight of glass and machined casting First production drawing estimate of seal.	+ 3.06
		+ 0.50
		+ 3.56
+ 5.35	Navigator's Canopy - Actual weight of MK 1 casting, window frame, and glass Detailed estimate made of hardware	+ 2.56
		+ 2.79
		+ 5.35
+ 15.15		

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

WEIGHT CHANGES

WEIGHT (lb.)

Engine Bay - Sta. 591.65" to 742.5"

+	1.43	Engine Rails - estimated to production drawings, increase in web gauge.	
-	11.65	Engine Doors # 1 and # 2 - first estimates to scheme drawings, allowances only previously	
		Door # 1	- 12.33
		Door # 2	+ 0.68
			- 11.65
-	10.22		

Rear Fuselage Sta. 742.5" Aft.

+	4.46	Engine Access Doors - Production drawing estimates of most frames, webs etc. increased in gauge compared to MK 1 on which earlier estimates were based.	
+	4.46		

Engine Group

	0.00	Starters & Gear Boxes on Engine - C.G. correction to C.S. Drive	
-	64.31	Fuel System - entirely redesigned for MK 2 Aircraft, the proportioners are no longer used.	
-	3.86	Engine Mounts - some production drawing estimates including design changes on front I/B Mounting	
-	3.83	Engine Mounting Accessories - some production drawing estimates - the locating block front centre mounting was over estimated.	
-	72.10		

Flying Controls Group

+	3.56	Mechanical Flying Controls - redesign O/B Aileron Control Rod	+ 2.24
		Addition of stick force transducer	+ 1.00
		Miscellaneous minor changes	+ 0.32
			+ 3.56
+	3.62	Flying Control Hydraulics I/W - Steel tubes replace Jarry hoses	+ 1.66
		Jack installation hardware	+ 1.00
		Miscellaneous other changes	+ 0.96
			+ 3.62
+	0.33	Flying Control Hydraulics Rudder - Miscellaneous minor piping changes etc.	
+	7.51		

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

WEIGHT CHANGES

WEIGHT (lb)

Equipment - Fixed & Removable

+ 18.35	Windscreen De-misting - increase in size of transformer	+ 10.00
	redesign of panel E 40	+ 2.00
	Controls etc. added for Navigator's window de-misting	+ 6.35
		+ 18.35
0.00	Electrics D.B. - C.G. correction for alternators	
+ 98.42	Ejector Seats - redesign of Martin Baker 80 ft/sec.	
	Ejection Seat - Manufacturer's weights	+ 76.00
	addition of Emergency Oxygen (called up with seat installation - see below	+ 22.42
		+ 98.42
- 19.85	Oxygen System - Emergency system now called up on Seats	
	see above	- 20.28
	redesign of piping in cockpit	+ 0.43
		- 19.85
+ 6.40	Low Pressure Pneumatics - piping for waveguide compressor, hydraulic system and armament pack	
	inflatable seal added (seal with pack structure.)	
+ 11.60	Utility Hydraulics D.B. - 200 cu. ins. accumulator replaces 80 cu. ins.	
- 18.25	Missile Pack Hydraulics - addition of 40 G.P.M. filter	+ 12.00
	Vendors weights available for majority of equipment.	- 30.25
		- 18.25
+ 20.70	Missile Pack Structure - previous estimates were made prior to issue of scheme drawings, structure now partially re-estimated.	
	Longitudinal beams # 1 to 8	+ 34.64
	Wing doors - largely redesigned	
	production drawing estimates	+ 19.64
	Fin doors - redesigned, production drawing estimates	+ 14.48
	Curtain wall - initial allowance too high	- 3.61
	Forward transverse beam - first drawing estimate	+ 1.42
	Gear Uplock structure - partial re-design	+ 1.48
	Pack and Door Sealing - seals on doors now included with production drawings of doors	- 11.74
	Door actuation mounting frames added	+ 2.60
	Door jack mounting frames added	+ 3.81
	Sliding Brackets added	+ 1.00
	Rear Beam, redesign of track 'back up' structure (tracks included)	+ 3.30
	continued.	

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Date: June 1st, 1957
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DETAILED WEIGHT CHANGES TO I.B.M.
TABULATED DETAILS OF May 1st, 1957.

WEIGHT CHANGES

WEIGHT (lb)

Equipment - Fixed & Removable (Cont'd.)

Missile Pack Structure (cont'd.)

Development allowance reduced since it is partially absorbed above	-	22.46
Forward attachment - now with mechanisms see below	-	8.86
Aft. Attachment - now mechanisms	-	15.00
	+	20.70

- 40.56 Sparrow Pack Mechanisms - these have mostly been re-estimated largely to production drawings.

Drag links - production drawing estimates	-	2.08
Uplocks - partially redesigned, production drawing estimates	-	0.56
Ground handling bars added at aft end	+	1.15
Launcher stops deleted	-	34.56
Small upstops added	+	2.56
Fwd pack attachment - now included here see also structure(above)	+	8.07
Aft. pack attachment - now included here	+	11.86
Fwd. & Aft Missile Telescopic Links-fairly extensive redesign	-	27.00
	-	40.56

+ 76.81

Operational Load

+ 15.00 Water Trapped Air Conditioning - no allowance was previously made for that water trapped in Evaporator.

+ 15.00

+ 50.13

TOTAL WEIGHT CHANGES

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Aircraft C-105 MK. 2
Production A/C

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Prepared By: K. Griffin

WEIGHT & C.G. SUMMARY

DESCRIPTION	WEIGHT lb.	H. ARM ins.	V. ARM ins.
STRUCTURE	18,350.01	564.26	137.68
Wing	9,980.77	642.76	142.21
Fin & Rudder	1,024.00	754.25	209.28
Fuselage Fwd. Sta. 255"	2,481.60	186.85	128.88
Sta. 255"-485"	1,681.78	379.07	129.47
Sta. 485"-591.65"	952.35	533.07	103.64
Sta. 591.65"-742.5"	1,480.48	661.39	109.39
Sta. 742.5" Aft.	696.45	795.40	127.90
'Marry Up'	52.58	468.91	103.89
UNDERCARRIAGE - Retracted	2,551.77	487.22	134.79
Main Undercarriages	1,901.62	539.31	141.00
Main U/C Doors & Fairings	291.80	537.10	138.40
Nose Undercarriage	333.81	170.80	99.70
Nose U/C Door & Fairing	24.54	162.24	88.23
POWER PLANT & SERVICES	10,685.88	674.15	121.33
Engines & Accessories P.S.13	9,090.12	690.98	121.17
Gear Box & Drives on Fuselage	281.84	601.70	102.49
Engine Controls	32.43	375.76	118.61
Gear Box, Starter & Drives on Engine	315.45	615.98	105.24
Engine Nose Bullet (Orenda supplied)	70.00	587.17	116.00
Fire Extinguisher System	70.46	702.44	134.82
Engine Mountings	132.38	666.82	136.52
Fuel System	693.20	530.62	134.87
FLYING CONTROLS GROUP	1,801.45	686.69	140.08
Mechanical Flying Controls	946.48	687.84	148.61
Hydraulic Flying Controls	854.97	685.42	130.63
EQUIPMENT - FIXED AND REMOVABLE	7,974.66	325.77	112.15
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	23.59	253.72	156.43
Air Conditioning System	897.00	331.77	133.38
Hydraulic Main System	609.09	500.86	117.57
Cabin Insulation	14.31	187.48	132.00
Brake Parachute	62.38	769.41	143.24
Electrical System	1,242.38	426.80	112.53
Low Pressure Pneumatics	55.70	416.79	123.99
Surface Finish	100.00	591.52	140.20
Intake De-icing Boots	51.84	197.02	118.00
Radome Anti-icing	8.88	51.49	125.00
Canopy Actuation	62.05	222.11	154.47
Cabin Consoles	17.45	174.76	124.34
Radar Door Actuation	10.00	268.00	95.00
Ejector Seats	284.42	202.80	136.25
Radio & Radar removable	1,850.50	178.50	104.46
Radio & Radar fixed	621.00	234.04	116.15

continued

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WEIGHT & C.G. SUMMARY

DESCRIPTION	WEIGHT lb.	H.ARM ins.	V.ARM ins.	M.A.C. %
Equipment (Fixed & Removable) (Cont'd.)				
Sparrow Pack Structure	870.70	389.60	96.00	
Sparrow Pack Mechanisms	584.76	377.66	98.93	
Sparrow Pack Hydraulics	331.94	373.52	99.00	
Sparrow Pack Electronics	143.00	332.00	100.00	
Sparrow Pack Electrics	64.10	362.29	95.00	
AIRCRAFT BASIC WEIGHT	41,363.77	547.25	128.46	
USEFUL LOAD (Normal Combat)	18,650.76	516.20	136.66	
Crew	430.00	194.00	136.50	
Oil	138.97	636.92	110.57	
Alcohol	22.00	93.00	138.00	
Engine Fire Extinguisher Fluid	25.00	730.00	129.00	
Residual Fuel	218.40	553.98	134.04	
Missiles	1,728.00	389.29	88.30	
Oxygen Charge	13.39	259.68	159.91	
Water for Air Conditioning	275.00	268.00	131.75	
Fuel for Combat Mission	15,800.00	542.05	142.30	
Normal Combat Mission U/C Up	60,014.53	537.60	131.01	28.07
U/C Down		539.19	128.37	28.51
Half Combat Mission Fuel (1,013 gals. @ 7.8 lb/gal.)	7,900.00	543.20	139.55	
Combat Weight (Half Combat Mission Fuel) U/C Up	52,114.53	537.10	128.88	27.93
U/C Down		538.94	125.84	28.44
Operational Weight Empty U/C Up	44,214.53	536.01	126.97	27.63
U/C Down		538.17	123.39	28.23
Operational Weight Empty Less Missiles U/C Up	42,486.53	541.98	128.54	29.28
U/C Down		544.23	124.82	29.90
Max. Internal Fuel (2,492 gals. @ 7.8 lb/gal.)	19,438.00	541.85	144.16	
A.U.W. Max. Internal Fuel U/C Up	63,652.53	537.79	132.22	28.12
U/C Down		539.29	129.73	28.53
Max. External Fuel (500 gal. @ 7.8 lb/gal. + Drop Tank)	4,248.20	521.84	60.67	
A.U.W. Max. Internal and External Fuel U/C Up	67,900.73	536.79	127.74	27.85
U/C Down		538.20	125.41	28.23

N.B. 1) Aircraft Datum = 120" above arbitrarily chosen ground line.

2) Drop Tank Weight has increased by 22 lb due to introduction of air bottle etc. in tank for transfer purposes.

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G9-12
10 X 10 TO THE 1/2 INCH
MADE IN CANADA

REPORT NO: 7-0400-34-3

BY: Kathleen Ryffla

DATE: June 19, 1954

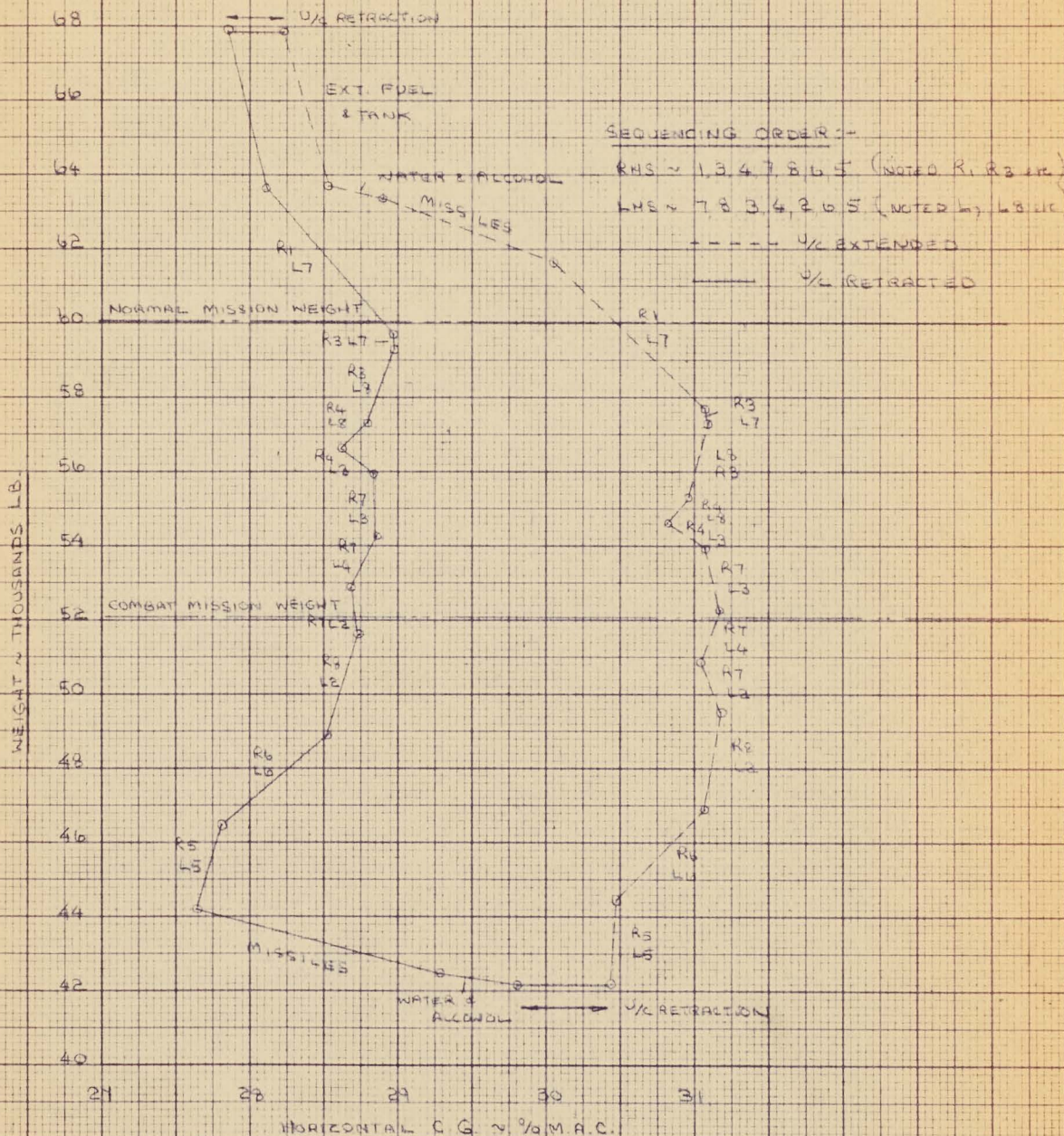
SHEET: 4-1

COS MK2 PRODUCTION AIRCRAFT
HORIZONTAL C.G. SCHEDULE FOR A
FLIGHT CONDITIONS

USING FUEL SEQUENCING ORDER AS SUPPLIED

TO MINNEAPOLIS HONZWEILL (W/ AVRO SPEC 303)

FOR USE UNTIL NECESSITY OF DAMPING SYSTEM PROVEN



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REPORT NO. T-0400 34-8
 31. Kothman 3/2/54
 DATE: June 1961
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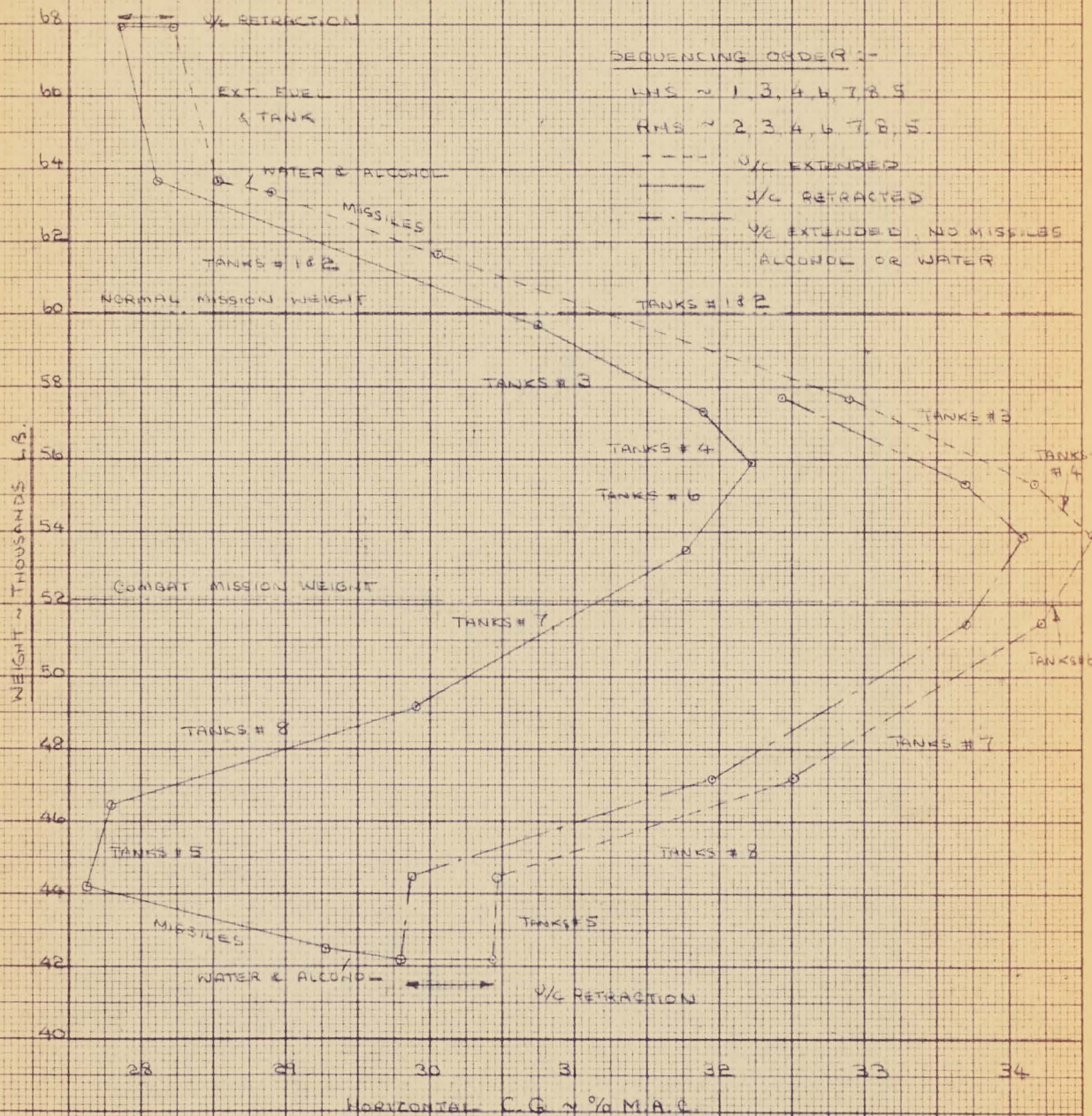
C105 MK2 PRODUCTION AIRCRAFT
 HORIZONTAL C.G. ENVELOPE FOR

A/C FLIGHT CONDITIONS

USING ALTERNATE FUEL SEQUENCING

AS SUPPLIED TO MINNEAPOLIS HONEYWELL (Ref AUTO Spec 503)

TO ACHIEVE REQUIRED 34% M.A.C. AT COMBAT



SECRET

G9-12
 10 X 10 TO THE 15 INCH
 MADE IN CANADA

AVRO AIRCRAFT LTD.

MALTON, ONT.

WEIGHT AND C. OF G BY FUNCTIONAL COMPONENT

PROJECT C-105 MK 2

DESCRIPTION		REFERENCE NO.	COMP. NO.	WEIGHT		
TOTAL WING GROUP		10000000				
OUTER WING		10100000				
100	OUTER WING SKINS	10100001	64	929	107	
100	POSTS AND INTERCOSTALS	10100002	64	24	367	
100	OUTER WING SPARS	10100003	64	392	587	
100	OUTER WING RIBS	10100004	64	134	566	
18	AILERON CONTROL BOX	10100006	64	379	207	
100	RIB 12	10100007	64	76	266	
100	O W AILERON JACK FITTING	10100009	64	10	467	
AILERON JOINTS AND FAIRING		10100010		329	37	
				1979	45	
AILERON		10200000				
100	AILERON STRUCTURE	10200001	74	336	007	
				336	00	
ELEVATOR MARRY UP		10300000		159	77	
97	ELEVATOR	10300000	82	449	007	
				464	97	
INNER WING		10400000				
79	MAIN U C STRUCTURE	10400001	62	330	715	
27	FRONT SPAR I W	10400002	62	111	104	
27	MAIN SPAR I W	10400003	62	146	395	
27	FWD CENTRE SPAR I W	10400004	62	42	458	
27	AFT CENTRE SPAR I W	10400005	62	338	66	
27	REAR SPAR	10400006	62	76	677	
32	I W STRUCTURE F S TO M S	10400007	62	1059	184	
	I W STRUCTURE M S TO R S	10400008	62	149	79	
3	STRUCTURE AFT OF REAR SPAR	10400009	62	304	681	
11	ELEVATOR CONTROL BOX I W	10400010	62	427	171	
25	TRANSP JOINT MARRY UP	10400011		70	656	
74	CENTRE LINE JOINTS	10400012	62	586	430	
	INNER WING SKINS	10400013	62	202	806	
	STRUT PICK UP FITTINGS	10400014	62	146	176	
31	RIBS 1 TO 9 INNER WING	10400016	62	512	046	
	DORSAL FAIRING	10400017	62		954	
100	RIB 10	10400018	62	108	006	
	FUSELAGE HINGE JOINT I W	10400019	62	138	126	
25	TRANSP JOINT	10400020	62	129	426	
	FUSELAGE HINGE JOINT	10400021		37	405	
	DORSAL FAIRINGS I W	10400023		56	295	
				6670	27	

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PROJECT _____

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT
	TOTAL FUSELAGE GROUP	30000000		
	FUSELAGE BASIC STRUCTURE	30100000		
	RADOME	3010000151		9840
	RADAR NOSE STRUCTURE	3010000351		18000
	SKIN F F	3010000452		80941
	SKIN C F	3010000554		210483
	SKIN D B	3010000656		58805
	SKIN E B	3010000758		164896
4	FORMERS F F	3010001152		105311
	FORMERS C F	3010001254		277863
	FORMER D B	3010001356		74575
	LIGHT FORMERS E B	3010001458		103706
	HEAVY FORMERS E B	3010001558		186586
	LOWER LONGERONS F F	3010001652		68461
	INNER LONGERON E B	3010001758		71846
	LONGERON E B	3010001858		69056
	TOP LONGERONS E B	3010001958		6386
	LOWER SHEAR PANEL	3010002052		29882
	TOP WING LONGERONS D B	3010002156		4985
	LONGERONS C F	3010002252		532
	LONGERONS C F	3010002354		138134
	LONGERONS D B	3010002556		105695
	ELECTRONICS BAY STRUCTURE	3010002654		45232
59	LONGITUDINAL BEAMS D B	3010002756		65705
	RADAR ACCESS DOOR C F	3010002854		21082
72	MAIN FRAME AT STN 538 77	3010002956		59805
	DIVE BRAKE ACCOM STRUCTURE	3010003056		36345
20	TOP LONGERONS F F	3010003152		185711
100	DUCT C F	3010003254		332863
	DUCT D B	3010003356		255005
	CANOPY ARCHES	3010003452		85352
4	ACCESS PANEL STIFFNERS	3010003656		38655
66	NOSE U C SUPPORT STRUCTURE	3010003752		33432
3	CREW BULKHEADS	3010003852		122722
	EQUIPMENT BAY STRUCTURE	3010003954		71112
86	WINDSCREEN	3010004152		130031
	SERV ACCESS DOORS AND PNLS	3010004258		60876
	DORSAL FAIRING AIR OUTLET	3010004454		20612
	INTERMEDIATE FORMERS E B	3010004558		48737
	ENGINE ACCESS DOORS E B	3010004658		107356
	SEALING MISSILE BAY	3010004754		6973
	MISCELLANEOUS ITEMS C F	3010004854		3923
	ARMAMENT BAY ROOF	3010004954		132163
	BULKHEAD AT STA 120	3010005052		30601
	BULKHEAD AT STA 255	3010005152		104292
	BULKHEAD STA 485	3010005254		123514
	ENG TUNNEL E B	3010005458		550316
	INTEGRAL FUS FUEL TANK	3010005554		203593
	COCKPIT FLOOR	3010005652		57431
	DORSAL OVER FUEL TANK	3010006154		50974

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WEIGHT AND C. OF G BY FUNCTIONAL
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PROJECT _____

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT
SHIELD EXHAUST DEFLECTOR	301006254		19653
SHEAR PANEL BELOW NAV ARCH	301006352		20742
PACK MOUNTING STRUCTURE	301006454		23652
ENG ACCESS DOORS R F	301006559		92407
TUNNEL FIXED R F	301006659		117887
SKIN AND INTERCOSTAL R F	301006759		51557
FAIRING UNDER RUDDER R F	301006859		26067
FORMERS FIXED R F	301006959		92907
LONGERONS C BEAM FIXED R F	301007059		27997
NACELLES REMOVABLE R F	301007159		195008
CNTR STRUC STING REMOV R F	301007259		92678
MISC ITEMS STRUCTURE E B	301007358		9126
MTG BRKTS SIDE PANEL D B	301007556		2135
FORMERS LOWER PANEL D B	301007656		76065
LOWER PANEL D B	301007756		50545
JOINT F F TO C F	3010078		8552
JOINT AIR INTAKES TO F F	3010079		9522
JOINT C F TO D B	3010080		5004
JOINT D B TO E B	3010081		25085
FUSE JOINT AT STA 742 50	3010082		4437
DROP TANK MTG STRUCT D B	301008356		8536
ENG RAILS ATTACHM TO FORM	301008558		36246
STRUCT AT ENG ACCESS DOORS	301008558		65436
MISC STRUCTURE F F	301008652		5521
			608742
96 DIVE BRAKES	302000072		111505
96 DIVE BRAKES C A	3020001		4064
			11556
AIR INTAKES	3030000		
AIR INTAKES	303010055		758282
			75828
PILOTS AND NAVIG CANOPIES	3040000		
76 PILOTS CANOPY	304010053		240811
			24081
48 NAVIGATORS CANOPY	304020053		143172
			14317

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PROJECT _____

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	
ENGINE GROUP	5000000			
PS 13 ENGINES	5010000		9075626	
			907562	
PS 13 ENGINES SERV ACCESS	5010100		14506	
			1450	
ACC GEAR BOX ON FUS D B	502000156		45245	
ACC GEAR BOX ON FUS E B	502000258		236606	
			28184	
ENGINE CONTROLS	5030000			
ENGINE CONTROLS F F	503000152		14581	
ENGINE CONTROLS C F	503000254		2643	
ENGINE CONTROLS D B	503000356		5084	
ENGINE CONTROLS E B	503000458		10136	
			3243	
STARTER AND ENG GEAR BOX	5040000		315456	
			31545	
ENGINE ANTI ICING	5050000		70005	
			7000	
FIRE EXT SYSTEM	5060000			
ENG FIRE EXT SYSTEM ENG	5060001		69007	
ENG FIRE EXT SYSTEM D B	506000256		1465	
			7046	
ENGINE MTGS AND BRACKETS	5070000			
ENGINE MOUNTS	5070001		84216	
ENGINE MTC ACCESSORIES	5070002		48176	
			13238	
FUEL SYSTEM	5080000			

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PROJECT _____

DESCRIPTION		REFERENCE NO.	COMP. NO.	WEIGHT	H
FIXED EQUIPMENT GROUP		7000000			
INSTRUMENTS		7010000			
INSTRUMENTS		7010000152		440716	
NAVIC TABLE AND STOWAGE		7010000452		20022	
				4607	
COCKPIT PRESSURE SEALING		7020000052		50018	
				500	
OXYGEN SYSTEM		7030000			
OXYGEN SYSTEM		7030000152		235925	
				2359	
AIR CONDITIONING SYSTEM		7040000			
AIR CONDITIONING SYST F F		7040000152		1319322	
AIR CONDITIONING SYST C F		7040000254		6305830	
AIR CONDITIONING SYST D B		7040000356		676353	
65	AIR CONDITIONING SYST E B	7040000458		668663	
				89700	
HYDRAULICS MAIN SYSTEM		7050000			
14	UTILITY HYDRAULICS F F	7050000152		841520	
5	UTILITY HYDRAULICS C F	7050000254		416241	
9	UTILITY HYDRAULICS D B	7050000356		2447655	
21	UTILITY HYDRAULICS E B	7050000458		724060	
23	UTILITY HYDRAULICS I W	7050000562		1331155	
14	UTILITY HYDR NOSE U C	7050000691		32510	
23	UTILITY HYDR MAIN U C	7050000792		298054	
				60909	
CABIN INSULATION		7070000052		143118	
				1431	
BRAKE PARACHUTE		7080000			
BRAKE PARACHUTE F F		7080000152		45516	
BRAKE PARACHUTE R F		7080000559		565982	
BRAKE PARACHUTE I W		7080000662		12462	
				6238	

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PROJECT _____

DESCRIPTION		REFERENCE NO.	COMP. NO.	WEIGHT
ELECTRICAL SYSTEM		7090000		
ELECTRICAL WIRING		7091400		
ELECTRICAL WIRING R N		709140151		129
ELECTRICAL WIRING F F		709140252		29661
ELECTRICAL WIRING C F		709140354		23543
ELECTRICAL WIRING A I		709140455		12742
ELECTRICAL WIRING D B		709140556		90155
ELECTRICAL WIRING E B		709140658		645
ELECTRICAL WIRING I W		709140862		89095
ELECTRICAL WIRING FIN		709140983		3527
ELECTRICAL WIRING N U C		709141091		3301
50 ELECTRICAL WIRING ENG		7091411		20026
ELECTRICAL WIRING C A		7091412		137463
				41141
30 ELECTRICS F F		709150052		152481
				15248
ELECTRICS C F		709160054		87094
				8709
ELECTRICS E B		709170058		6706
ELECTRICS ENG		7091701		134325
ELECTRICS C A		7091702		7186
				14820
ELECTRICS FIN		709180083		838
				83
ELECTRICS I W		709190062		23366
ELECTRICS C A		7091901		1126
ELECTRICS M U C		709190292		745
				2522
ELECTRICS A I		709200055		50902
				5090
ELECTRICS D B		709210056		317895
				31789
WINDSCREEN DEMISTING		709220052		43862
				4386

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DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H
REMOVABLE EQUIPMENT GROUP	8000000			
EJECTOR SEATS	801010052		2844220	
			28442	
RADAR REMOV GROUP	8020000			
RADAR REMOVABLE	8020100			
RADIO AND RADAR REM R N	802010151		98050	9
RADIO AND RADAR REM F F	802010252		18900	10
RADIO AND RADAR REM C F	802010354		59600	20
RADIO AND RADAR REM D B	802010456		4150	52
RADIO AND RADAR REM C A	8020106		4350	55
			185050	
SPARROW PACK	8050000			
SPARROW PACK STRUCTURE	805010094		8707038	
			87070	
SPARROW PACK MECHANISMS	805020094		5847637	
			58476	
SPARROW PACK HYDRAULICS	805030094		3319437	
			33194	
SPARROW PACK ELECTRONICS	805040094		1430033	
			14300	
SPARROW PACK ELECTRICS	805050054		641030	
			6410	

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PROJECT _____

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT
OPERATIONAL LOAD	9000000		
CREW MEMBERS	901000052		430001
			43000
ENGINE OIL	9020000		
ENGINE OIL DRAINABLE	9020001		92906
ENGINE OIL TRAPPED ENG	9020002		17736
ENGINE OIL TRAPPED D B	902000356		19255
ENGINE OIL TRAPPED E B	902000456		9095
			13897
SPARROW MISSILES	903000054		1728003
			172800
OXYGEN CHARGE	9040000		
OXYGEN CHARGE F F	904000152		722
OXYGEN CHARGE C F	904000254		12672
			1339
ALCOHOL FOR RADOME DEICING	905000051		2200
			2200
ENGINE FIRE EXT FLUID	9060000		25007
			2500
RESIDUAL FUEL	9070000		
RESIDUAL FUEL C F	907000154		46803
RESIDUAL FUEL I W	907000262		171605
			21840
WATER FOR AIR CONDITIONING	910000054		260002
UNUSABLE WATER FOR AIRCOND	910000154		15002
			27500

