



B747

Load and Balance Manual

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REVISION RECORD

SUMMARY OF CHANGES – REV 2

Page Ref.	Description of Changes
Weight & Balance	B747 Super Hi-J (275 Seater) – Reduced MTOW B747 Mid-J (337 Seater) – Reduced MTOW & MLW Standard Passenger Weights – Flights to and from Japan USA Maximum Take-Off Weight Removal of Potable Water from Basic Weight Correction to allowance for Passengers Exceeding Standard Passenger Weights Amended Ground Ops Manual references Constant Climate Cargo Code and NOTOC Sign-off
Loading	Change of MAG NOTOC Requirement Amendment to carriage of Perishable Goods details for clarification Conditions for Carriage of A-Base size 88 in × 125 in ULDs in Excess of 4626 kg Malfunction of the Lateral Guide Rail Change to NOTOC Temperature Setting Requirement Amended Ground Ops Manual references

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Approved Signatory:

1. This LEP is a complete re-issue showing individual page numbers.
2. Record this revision number on the Record Sheet in the front of this manual.

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SECTION 1 OPERATIONAL LIMITATIONS

Summary of Aircraft Weight and Fuel Management Limitations

1.1 Maximum Authorised Weights (kg)

Registrations	Taxi Weight (kg)	Take-off Weight (kg)	Landing Weight (kg)	Zero Fuel Weight (kg)
G-BNLK, NLN, NLP, NLY	380,000	378,000		
G-CIVA thro' IVE G-CIVJ thro' IVP G-CIVT, IVU	370,000*	368,000*	269,000	246,750
G-BYGA thro' YGG G-CIVR, IVS G-CIVV thro' IVZ	366,000 357,000*	364,000 355,000*	285,760	246,750
G-CIVF thro' IVI	366,000 357,000*	364,000 355,000*	285,760	251,740

* For departures ex USA (see [Note 3](#)).

Notes: Maximum in-flight weight with flaps 25 and 30 is 303,906 kg.

Note 1: Any weight in excess of the Maximum Take-off Weight must consist of taxi fuel.

Note 2: For a fuel density of 0.77 kg/litre or below, the Maximum Take-off Weight may be further limited based on the Take-off Centre of Gravity. Refer to Balance Chart for specific limitations.

Note 3: The aircraft Weight Schedule shows the highest MTOW applicable to the aircraft. For all departures ex USA, the alternative MTOW, is indicated above. This MTOW must be respected, including in the event of a diversion into the USA.

For all other departures, including flights to the USA, the standard MTOW will apply.

1.2 Fuel

1.2.1 General

The balance charts contained in this manual are based on the standard fuel loading and standard fuel usage procedures.

1.2.2 Maximum Usable Fuel

Without HST (Horizontal Stab Tank) fuel 205,599 litres

With HST (Horizontal Stab Tank) fuel 218,469 litres

Tank maxima are shown to cover a/c variation.

Note: A/C G-CIVF, G, H, I have no HST (Horizontal Stab Tank) Capability.

1.2.3 Usable Tank Capacities

Tanks' Capacities

	RES No.3	MAIN No.4	MAIN No.3	CENTRE	MAIN No.2	MAIN No.1	RES No.2	HST	TOTAL
Litres	5004	16,966	47,492	64,973	47,492	16,966	5004	12,492	216,389
Imp Galls	1101	3732	10,447	14,292	10,447	3732	1101	2748	47,600
US Galls	1322	4482	12,546	17,164	12,546	4482	1322	3300	57,164

1.2.4 Operational Limitations Using HST Fuel

Whenever possible, the HST (Horizontal Stab Tank) should be used with fuel loads of 150,000 kg and above, unless advised not to by load control. A flow chart depicting when and when not to use HST (Horizontal Stab Tank) fuel is shown in [Section 1.3](#).

Fuel loading limitations are listed below:

- All wing tanks must be full for operation with HST (Horizontal Stab Tank).
- No HST (Horizontal Stab Tank) fuel is allowed if Centre Tank unusable ballast fuel exceeds 34,067 litres.
- If not using the automated fuel system, Centre and HST must be loaded concurrently, or load Centre Tank first to prevent tipping the aircraft.
- The maximum and minimum allowable HST (Horizontal Stab Tank) weights at varying densities, for total aircraft fuel loads are shown on [Table 1](#) to [Table 5](#).

When using automatic fuelling, useful guides to Wing and Centre Tank/HST (Horizontal Stab Tank) loads are shown in [Table](#) and [Section 1.2.10](#). The values in the table in [Table](#) may vary according to density, so when planning a load distribution, plan for a C.G. tolerance movement of +/- 300 kg in the HST.



HST (Horizontal Stab Tank) Fuel Tolerance

- There is no requirement to revise the fuel distribution for trim purposes when the final fuel load in the HST (horizontal stab tank) **Fuel Tolerance**.
- There is no requirement to revise the fuel distribution for trim purposes when the final fuel load in the HST (Horizontal Stab Tank) is within
+/- 300 kg of the trimmed figure.

1.2.5 Fuel LMCs (Captain Only)

See also [Section 3.3](#).

Fuel Tolerance +/- 1000 kg.

When a fuel discrepancy exists (Tech Log against Loadsheets), only the Captain is authorised to adjust their copy of the Loadsheets and, in so doing, to ensure none of the regulated or max authorised weights have been exceeded.

1.2.6 Start-up and Taxi Allowance

1. When the CIRRUS Fuel figures are automatically processed by British Airways DCS then the variable Taxi Fuel will be taken into account in deriving the Take-off (Loadsheets) Fuel figures.
2. In all other circumstances the flight crew will pass/confirm the Variable Taxi Fuel data.

Viz:

- a. When the DCS-CIRRUS link is inoperative.
- b. When other airlines EDP Systems are used.
- c. When the Loadsheets is prepared manually.

1.2.7 Minimum Fuel for Take-off

Use Flight Plan Fuel. For fuel loads less than 25,000 kg use Index value of -3 Index Units.

1.2.8 Centre Tank Unusable Fuel

1. If for any reason unusable fuel is carried in the centre tank e.g. scavenge pump U/S, then the weight of the unusable fuel should be included in the Dry Operating Weight and Index, the adjustment being -2 Index Units per 1000 kg.
2. When checking the LITOW and finding the %MAC for the Take-off, the Take-off fuel used should NOT include the unusable fuel in the centre tank.

1.2.9 B747-436 HST Usage Flow Chart

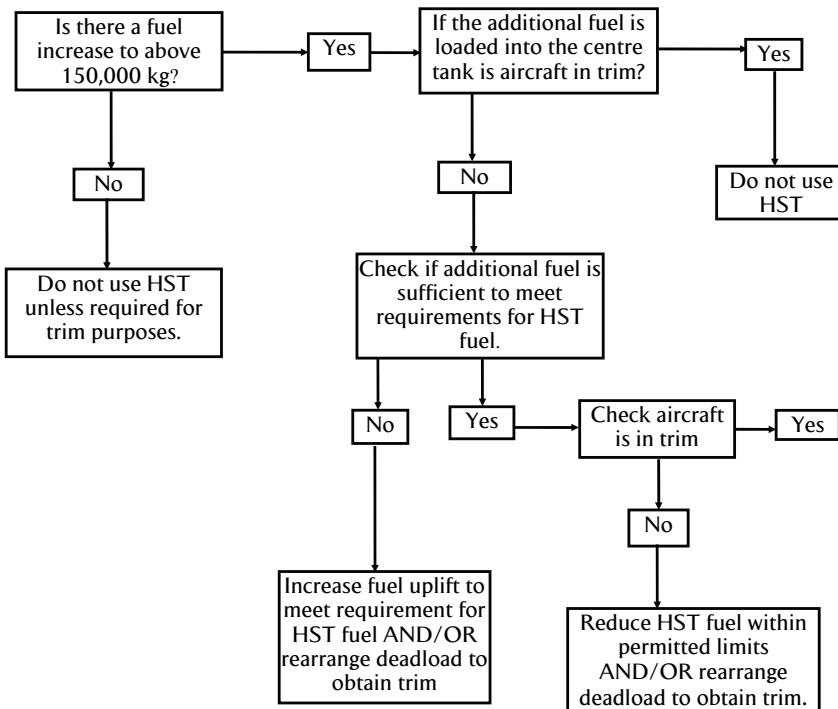
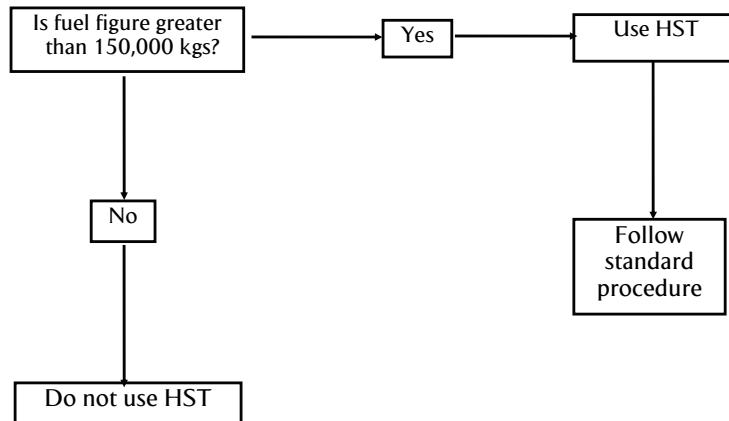


Table 1 Fuel Distribution for Various Specific Gravities
Fuel S.G = 0.78

Total Fuel (kg)	Minimum HST Fuel (kg)	Maximum HST Fuel (kg)	Total Fuel (kg)	Minimum HST Fuel (kg)	Maximum HST Fuel (kg)
130000	1477	3490	151000	1477	6877
131000	1477	3651	152000	1477	7039
132000	1477	3813	153000	1477	7200
133000	1477	3974	154000	1477	7361
134000	1477	4135	155000	1477	7522
135000	1477	4297	156000	1477	7684
136000	1477	4458	157000	1477	7845
137000	1477	4619	158000	1477	8006
138000	1477	4781	159000	1477	8168
139000	1477	4942	160000	1477	8329
140000	1477	5103	161000	1477	8490
141000	1477	5264	162000	1477	8651
142000	1477	5426	163000	1477	8813
143000	1477	5587	164000	1477	8974
144000	1477	5748	165000	1477	9135
145000	1477	5910	166000	1477	9297
146000	1477	6071	167000	1477	9458
147000	1477	6232	168000	1477	9619
148000	1477	6393	169000	1477	9743
149000	1477	6555			
150000	1477	6716			

Table 2 Fuel S.G = 0.79

Total Fuel (kg)	Minimum HST Fuel (kg)	Maximum HST Fuel (kg)	Total Fuel (kg)	Minimum HST Fuel (kg)	Maximum HST Fuel (kg)
130000	1495	3266	151000	1495	6653
131000	1495	3427	152000	1495	6815
132000	1495	3589	153000	1495	6976
133000	1495	3750	154000	1495	7137
134000	1495	3911	155000	1495	7298
135000	1495	4073	156000	1495	7460
136000	1495	4234	157000	1495	7621
137000	1495	4395	158000	1495	7782
138000	1495	4556	159000	1495	7944
139000	1495	4718	160000	1495	8105
140000	1495	4879	161000	1495	8266
141000	1495	5040	162000	1495	8427
142000	1495	5202	163000	1495	8589
143000	1495	5363	164000	1495	8750
144000	1495	5524	165000	1495	8911
145000	1495	5685	166000	1495	9073
146000	1495	5847	167000	1495	9234
147000	1495	6008	168000	1495	9395
148000	1495	6169	169000	1495	9556
149000	1495	6331	170000	1495	9718
150000	1495	6492	171000	1495	9868

Table 3 Fuel S.G = 0.80

Total Fuel (kg)	Minimum HST Fuel (kg)	Maximum HST Fuel (kg)	Total Fuel (kg)	Minimum HST Fuel (kg)	Maximum HST Fuel (kg)
130000	1514	3042	156000	1514	7236
131000	1514	3203	157000	1514	7397
132000	1514	3365	158000	1514	7558
133000	1514	6526	159000	1514	7719
134000	1514	3687	160000	1514	7881
135000	1514	3849	161000	1514	8042
136000	1514	4010	162000	1514	8203
137000	1514	4171	163000	1514	8365
138000	1514	4332	164000	1514	8526
139000	1514	4494	165000	1514	8687
140000	1514	4655	166000	1514	8849
141000	1514	4816	167000	1514	9010
142000	1514	4978	168000	1514	9171
143000	1514	5139	169000	1514	9332
144000	1514	5300	170000	1514	9494
145000	1514	5461	171000	1514	9655
146000	1514	5623	172000	1514	9816
147000	1514	5784	173000	1514	9978
148000	1514	5945	174000	1514	9993
149000	1514	6107			
150000	1514	6268			
151000	1514	6429			
152000	1514	6590			
153000	1514	6752			
154000	1514	6913			
155000	1514	7074			

**Table 4 Fuel S.G = 0.81**

Total Fuel (kg)	Minimum HST Fuel (kg)	Maximum HST Fuel (kg)	Total Fuel (kg)	Minimum HST Fuel (kg)	Maximum HST Fuel (kg)
130000	1533	2820	156000	1533	7012
131000	1533	2980	157000	1533	7173
132000	1533	3141	158000	1533	7334
133000	1533	3302	159000	1533	7495
134000	1533	3463	160000	1533	7657
135000	1533	3624	161000	1533	7818
136000	1533	3786	162000	1533	7979
137000	1533	3947	163000	1533	8141
138000	1533	4108	164000	1533	8302
139000	1533	4270	165000	1533	8463
140000	1533	4431	166000	1533	8624
141000	1533	4592	167000	1533	8786
142000	1533	4753	168000	1533	8947
143000	1533	4915	169000	1533	9108
144000	1533	5076	170000	1533	9270
145000	1533	5237	171000	1533	9431
146000	1533	5399	172000	1533	9592
147000	1533	5560	173000	1533	9753
148000	1533	5721	174000	1533	9915
149000	1533	5883	175000	1533	10076
150000	1533	6044	176000	1533	10118
151000	1533	6205			
152000	1533	6366			
153000	1533	6528			
154000	1533	6689			
155000	1533	6850			

Table 5 Fuel S.G = 0.82

Total Fuel (kg)	Minimum HST Fuel (kg)	Maximum HST Fuel (kg)	Total Fuel (kg)	Minimum HST Fuel (kg)	Maximum HST Fuel (kg)
130000	1552	2600	156000	1552	6787
131000	1552	2760	157000	1552	6949
132000	1552	2920	158000	1552	7110
133000	1552	3080	159000	1552	7271
134000	1552	3239	160000	1552	7433
135000	1552	3400	161000	1552	7594
136000	1552	3562	162000	1552	7755
137000	1552	3723	163000	1552	7917
138000	1552	3884	164000	1552	8078
139000	1552	4046	165000	1552	8239
140000	1552	4207	166000	1552	8400
141000	1552	4368	167000	1552	8562
142000	1552	4529	168000	1552	8723
143000	1552	4691	169000	1552	8884
144000	1552	4852	170000	1552	9046
145000	1552	5013	171000	1552	9207
146000	1552	5175	172000	1552	9368
147000	1552	5336	173000	1552	9529
148000	1552	5497	174000	1552	9691
149000	1552	5658	175000	1552	9852
150000	1552	5820	176000	1552	10013
151000	1552	5981	177000	1552	10175
152000	1552	6142	178000	1552	10243
153000	1552	6304			
154000	1552	6465			
155000	1552	6626			

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Table 6 Typical Fuel Load Distribution (Wings and Centre Tank)/HST at Various Densities – When HST is Used

0.78 kg/litres			0.79 kg/litres			0.8 kg/litres			0.81 kg/litres			0.82 kg/litres		
Total Fuel	Wings and Centre	HST	Total Fuel	Wings and Centre	HST	Total Fuel	Wings and Centre	HST	Total Fuel	Wings and Centre	HST	Total Fuel	Wings and Centre	HST
150000	143284	6716	150000	143508	6492	150000	143732	6268	150000	143956	6044	150000	144180	5820
151000	144123	6877	151000	144347	6653	151000	144571	6429	151000	144795	6205	151000	145019	5981
152000	144961	7039	152000	145185	6815	152000	145510	6590	152000	145634	6366	152000	145858	6142
153000	145800	7200	153000	146024	6976	153000	146248	6752	153000	146472	6528	153000	146696	6304
154000	146639	7361	154000	146863	7137	154000	147087	6913	154000	147311	6689	154000	147535	6465
155000	147478	7522	155000	147702	7298	155000	147926	7074	155000	148150	6850	155000	148374	6626
156000	148316	7684	156000	148540	7460	156000	148764	7236	156000	148988	7012	156000	149213	6787
157000	149155	7845	157000	149379	7621	157000	149603	7397	157000	149827	7173	157000	150051	6949
158000	149994	8006	158000	150218	7782	158000	150442	7558	158000	150666	7334	158000	150890	7110
159000	150832	8168	159000	151056	7944	159000	151281	7719	159000	151505	7495	159000	151729	7271
160000	151671	8329	160000	151895	8105	160000	152119	7881	160000	152343	7657	160000	152567	7433
161000	152510	8490	161000	152734	8266	161000	152958	8042	161000	153182	7818	161000	153406	7594
162000	153349	8651	162000	153573	8427	162000	153797	8203	162000	154021	7979	162000	154245	7755
163000	154187	8813	163000	154411	8589	163000	154635	8365	163000	154859	8141	163000	155083	7917
164000	155026	8974	164000	155250	8750	164000	155474	8526	164000	155698	8302	164000	155922	8078
165000	155865	9135	165000	156089	8911	165000	156313	8687	165000	156537	8463	165000	156761	8239
166000	156703	9297	166000	156927	9073	166000	157151	8849	166000	157376	8624	166000	157600	8400
167000	157542	9458	167000	157766	9234	167000	157990	9010	167000	158214	8786	167000	158438	8562
168000	158381	9619	168000	158605	9395	168000	158829	9171	168000	159053	8947	168000	159277	8723
168760	158979	9718	169000	159444	9556	169000	159668	9332	169000	159892	9108	169000	160116	8884
All weights in kilogrammes per			170000	160282	9718	170000	160506	9494	170000	160730	9270	170000	160954	9046
			171000	161121	9879	171000	161345	9655	171000	161569	9431	171000	161793	9207
			172000	161960	10040	172000	162184	9816	172000	162408	9592	172000	162632	9368
All weights in kilogrammes per			173000	163022	9978	173000	163247	9753	173000	163471	9529	174000	164085	9915
			174000	163861	10139	174000	164085	9915	175000	164924	10076	175000	165148	9852
All weights in kilogrammes per			176000	165763	10237	176000	166825	10175	177000	167664	10336	178000	168500	10513
All weights in kilogrammes per														

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1.2.10 Fuel Load Increments of Less Than 1000 kg

Use the following table to calculate the fuel split between Centre and Stab Tanks when there is a fuel load increment of less than a 1000 kg. Fuel has been considered to have been loaded automatically with a Centre/Stab split of 5.2:1 ratio.

All weights shown in kilograms.

Fuel Increment	Centre Tank	Stab Tank
100	84	16
200	168	32
300	252	48
400	336	64
500	420	80
600	504	96
700	588	112
800	672	128
900	756	144



1.3

Potable Water SWA

The amount of potable water uplift must be verified and the following SWA must be applied on the loadsheet.

B747-436 (All Fitted Interiors) Potable Water SWA Table		
Water Quantity #	SWA (Weight Change)	SWA (Index Change)
(Gauged)	(kg)	(IU)
EMPTY	0	0
1/8 (or 13%)	148	0
1/4 (2/8 or 25%)	297	-1
3/8 (or 38%)	445	-1
1/2 (4/8 or 50%)	593	-2
5/8 (or 63%)	741	-2
3/4 (6/8 or 75%)	890	-3
7/8 (or 88%)	1038	-3
FULL	1186	-4

For quantities between those quoted above please use nearest applicable SWA.

1.4 Special Cases

Inoperative Escape Facilities

An inoperative escape facility is a door or an escape slide which is not capable of fulfilling the function for which it is provided.

1. Passenger Door/Slides

One door or slide may be inoperative for flight, provided all other passenger doors/slides are serviceable in every aspect.

2. Passenger Restrictions

For the purpose of the limitations below, the Upper Deck is NOT to be considered part of Cabin Areas OA and/or OB.



B747-436 Heavy, (14F/70J/30W/177M) (291 Pax) Fitted Interior 14F70J30W177M..74G.C								
Permitted Capacity with Left or Right Hand Door Inoperative.						Seat Reduction		
A/C Config	Zone					Total	Seat Reduction	
	OA	OB	OC	OD	OE/OF	OU		
Door 1	14	18	32	70	137	20	291	0
Door 2	14	18	32	70	137	20	291	0
Door 3	14	18	32	70	137	20	291	0
Door 4	14	18	32	70	110	20	264	27
Door 5	14	18	32	70	110	20	264	27
Door U/D	14	18	32	70	137	20	291	0

B747-436 Maxi/Lite, (14F/70J/30W/185M) (299 Pax) Fitted Interior 14F70J30W185M..74K.C/14F70J30W185M..74P.C								
Permitted capacity with left or right hand door inoperative.						Seat Reduction		
A/C Config	Zone					TOTAL	Seat Reduction	
	OA	OB	OC	OD	OE/OF	OU		
Door 1	14	18	32	70	145	20	299	0
Door 2	14	18	32	70	145	20	299	0
Door 3	14	18	32	70	145	20	299	0
Door 4	14	18	32	70	110	20	264	35
Door 5	14	18	32	70	110	20	264	35
Door U/D	14	18	32	70	145	20	299	0

B747-436 Heavy, (14F/52J/36W/235M) (337 Pax) Fitted Interior 14F52J36W235M..74I.C/14F52J36W235M..74J.C								
Permitted capacity with left or right hand door inoperative.						Seat Reduction		
A/C Config	Zone					TOTAL	Seat Reduction	
	OA	OB	OC	OD	OE/OF	OU		
Door 1	14	36	32	98	137	20	337	0
Door 2	14	36	32	98	137	20	337	0
Door 3	14	36	32	98	122	20	322	15
Door 4	14	36	32	98	110	20	310	27
Door 5	14	36	32	98	110	20	310	27
Door U/D	14	36	32	98	137	20	337	0



British Airways B747-436, Super High-J

INOPERATIVE EXITS - MAXIMUM PERMITTED AEROPLANE CAPACITY TABLE

		No. 1 Exit Inop. L/H or RH Type A (Door 1) Pax Exit Rating: 110	No. 2 Exit Inop. L/H or RH Type A (Door 2) Pax Exit Rating: 110	No. 3 Exit Inop. L/H or RH Type A (Door 3) Pax Exit Rating: 10	No. 4 Exit Inop. L/H or RH Type A (Door 4) Pax Exit Rating: 110	No. 5 Exit Inop. L/H or RH Type A (Door 5) Pax Exit Rating: 110	Upper Deck Exit Inop. L/H or RH Type 1 (Upper Deck) Pax Exit Rating: 45							
Zone A	14	L/H or RH Type A (Door 1) Zone B	18	L/H or RH Type A (Door 2) Zone C	32	L/H or RH Type A (Door 3) Zone D	46	L/H or RH Type A (Door 4) Zone E	145	L/H or RH Type A (Door 5)	20	L/H or RH Type 1 (Upper Deck) Pax Exit Rating: 110	110	L/H or RH Type 1 (Upper Deck) Pax Exit Rating: 45
ULD		Slide/raft cert rated capacity (per pair)	Slide/raft cert rated capacity (per pair)	Slide/raft cert rated capacity (per pair)	Slide/raft cert rated capacity (per pair)	Slide/raft cert rated capacity (per pair)	Slide/raft cert rated capacity (per pair)							
Total	275	160	275	0	275	120	120							
Max Permitted AC Capacity (MPAC)	275	275	275	240	240	240	240							
Max approved passenger seating configuration (MAPSC) <i>MAPSC must not exceed MPAC</i>	275	275	275	240	240	240	240							
Pax Capacity of Zone A (Between Nose and Door 1) (Zone A Pax can pass thru Door 1)	14	14	14	14	14	14	14							
Pax Capacity of Zone B (Between Door 1 & Door 2)	18	18	18	18	18	18	18							
Pax Capacity of Zone C (Between Door 2 & Door 3)	32	32	32	32	32	32	32							
Pax Capacity of Zone D (Between Door 3 & Door 4)	46	46	46	46	46	46	46							
Pax Capacity of Zone E (Between Door 4 & Door 5)	145	145	145	110	110	110	145							
Pax Capacity of Upper Deck (see FODDCM 8.89 App B)	20	20	20	20	20	20	20							
Blocked seats in Zone A	0	0	0	0	0	0	0							
Blocked seats in Zone B	0	0	0	0	0	0	0							
Blocked seats in Zone C	0	0	0	0	0	0	0							
Blocked seats in Zone D	0	0	0	0	0	0	0							
Blocked seats in Zone E	0	0	0	0	0	0	0							
Total No. of blocked seats in aircraft	0	0	0	0	0	0	0							

Spreadsheet design
Ian Carter



1.5 Aircraft Configuration, Weight and Index Data

1.5.1 Aircraft Configuration

Maximum Approved Passenger Seating Configuration (MAPSC) is shown below.

Fitted Interior	MAPSC
14F70J30W177M..74G.C	291
14F70J30W185M..74K.C 14F70J30W185M..74P.C	299
14F52J36W235M..74I.C 14F52J36W235M..74J.C	337
F14J86W30M145..74S.C	275

See [Section 2.1](#) – Interior Layouts for details of valid aircraft versions.

1.5.2 Dry Operating Weight and Index

The Dry Operating Weight and Index is obtained by adding to the Basic Weight and Index, the Crew and Pantry Weights and Indices and any other adjustments, including Potable Water, to the Basic Weight and Index.

1.5.3 Basic Weight and Index

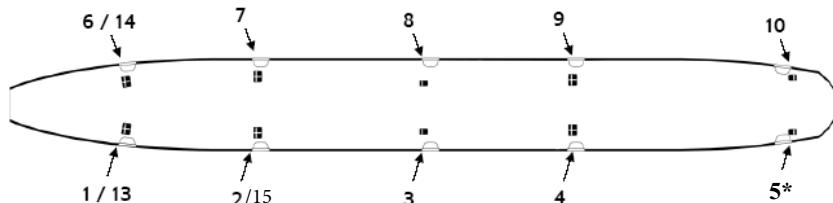
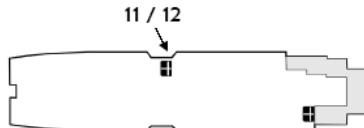
The Basic Weight and Index is obtained from the Weight and Centre of Gravity Schedule Extract available on DocuNet and eManuals.

The Basic Weight is defined as the empty weight of the aircraft – it includes furnishings, fixed, loose and safety equipment plus toilet fluid and system fluids (i.e. engine oil, hydraulic fluid, unusable fuel). The Basic Index is derived from a calculation involving the Centre of Gravity and Basic Weight of the aircraft.

1.5.4 Crew Weight and Indices (kg/I.U.)

Use the appropriate table depending on the crew baggage weight being used and the route operated.

The index effect assumes Technical Crew seated on the Flight Deck and the appropriate number of Cabin Crew seated in the following positions.



*If 10 crew only carried, position 5 is unoccupied.

For any crew combination not included below, refer to the table on the reverse of the Balance Chart.

A. Long Haul Route

Tech	Cabin													
	0		10		11		12		13		14		15	
	Wt	Index	Wt	Index	Wt	Index	Wt	Index	Wt	Index	Wt	Index	Wt	Index
2	202	-2	1112	-5	1203	-4	1294	-4	1385	-5	1476	-6	1567	-7
3	303	-3	1213	-6	1304	-5	1395	-5	1486	-6	1577	-7	1668	-7
4	404	-4	1314	-6	1405	-6	1496	-6	1587	-7	1678	-8	1769	-8

Note 1: Notional Weights:

- Flight Deck Crew including cabin baggage 85 kg each.
- Cabin Crew including cabin baggage 75 kg each.
- Hold baggage, stowed in Compartment 1 16 kg each.

B. Short Haul Route

Tech	Cabin													
	0		10		11		12		13		14		15	
	Wt	Index	Wt	Index	Wt	Index	Wt	Index	Wt	Index	Wt	Index	Wt	Index
2	170	-2	920	-3	995	-2	1070	-3	1145	-3	1220	-4	1295	-4
3	255	-3	1005	-4	1080	-3	1155	-4	1230	-4	1305	-5	1380	-5
4	340	-3	1090	-5	1165	-4	1240	-4	1315	-5	1390	-6	1465	-6

Note 1: Notional Weights:

- Flight Deck Crew including cabin baggage 85 kg each.
- Cabin Crew including cabin baggage 75 kg each.

Note 2: Additional Baggage:

If crews have nightstop baggage which needs to be stowed in a hold, then a weight of 14 kg per piece shall be used for Loadsheet purposes. Enter the resultant total Weight/Index on the spare line on a Manual Loadsheet when deriving the Dry operating Weight/Index. When using a system produced Loadsheet create a Service Weight/Index adjustment.

1.5.5 Catering Weights and Indices

Catering Weights and Indices are now available on the Flight Ops Intranet page with the following path:

Home/Departments/Flight Operations/Tech & Training/Flight Technical Services/Catering Product & Pantry Codes.

Select the relevant Fitted Interior and Aircraft type in order to find the applicable catering weights and index information.

In order to find which Catering Product Code is being used on a particular sector contact CLC.

1.5.6 Ground Stability

Indiscriminate loading/unloading of baggage and cargo, simultaneously with passengers embarking or disembarking, may produce large shifts in the aircraft's centre of gravity. In some circumstances this could result in damage occurring to the passenger door and/or the passenger-loading jetty and, in extreme cases, may cause the aircraft to tip.

BA best practice is to ensure the forward and aft cargo holds are loaded and unloaded simultaneously or the forward cargo hold is loaded first and unloaded last.

The ground stability 'differential' is the weight difference between the loads in the aft and the forward holds. This condition is calculated based on passengers seated aft of the main landing gear plus the differential. This places the aircraft near its manufacturers ground stability limit, which is where the load on the nose gear is reduced sufficiently enough as to cause difficult ground handling conditions.

If the weight in the aft hold is greater than the weight in the forward hold by the figures for the aircraft types stated below, the differential has been exceeded.

Aircraft Type	Differential
B747-400	12,000 kg

The aircraft can safely depart with the differential exceeded, providing it is within normal operational limits (see OMB 2.9.9.c Ground Stability Message).

1.5.7 Towing

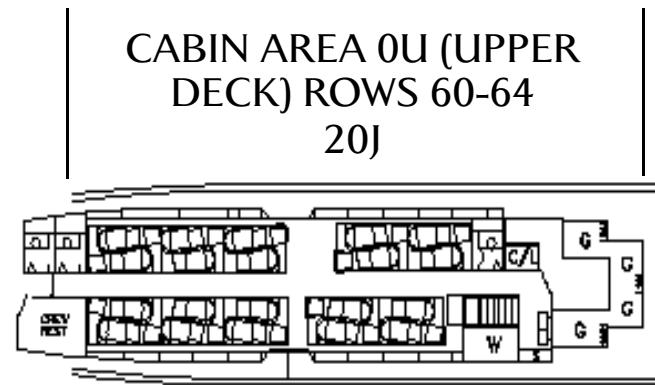
To ensure A/C is within the appropriate C.G. limits for towing refer to Chapter WB 3 for use of Towing Balance Chart 744/T (V97) ([Section 3.4.4.1](#)).

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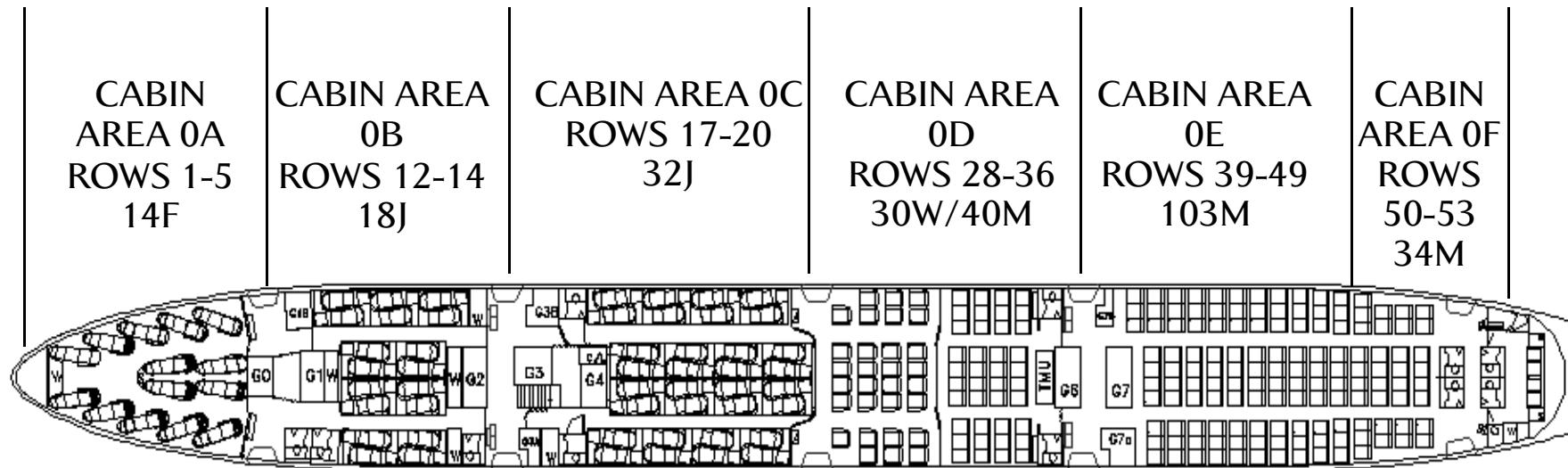
SECTION 2 INTERIOR LAYOUTS

2.1 Aircraft Version and Seating Configuration

Figure 1 HI-J Stretch Fitted Interior 14F70J30W177M..74G.C



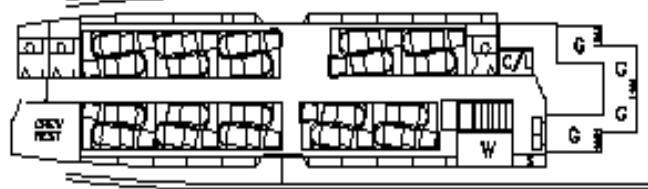
**B747-436 Fitted Interior:
14F70J30W177M..74G.C
MAXIMUM APPROVED PASSENGER
SEATING CONFIGURATION:
291 SEATER**



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Figure 2 HI-J Stretch Fitted Interior 14F70J30W185M..74K.C and 14F70J30W185M..74P.C

CABIN AREA 0U (UPPER DECK) ROWS 60-64
20J



B747-436 Fitted Interior:
14F70J30W185M..74K.C
14F70J30W185M..74P.C
MAXIMUM APPROVED PASSENGER SEATING CONFIGURATION:
299 SEATER

CABIN AREA 0A
ROWS 1-5
14F

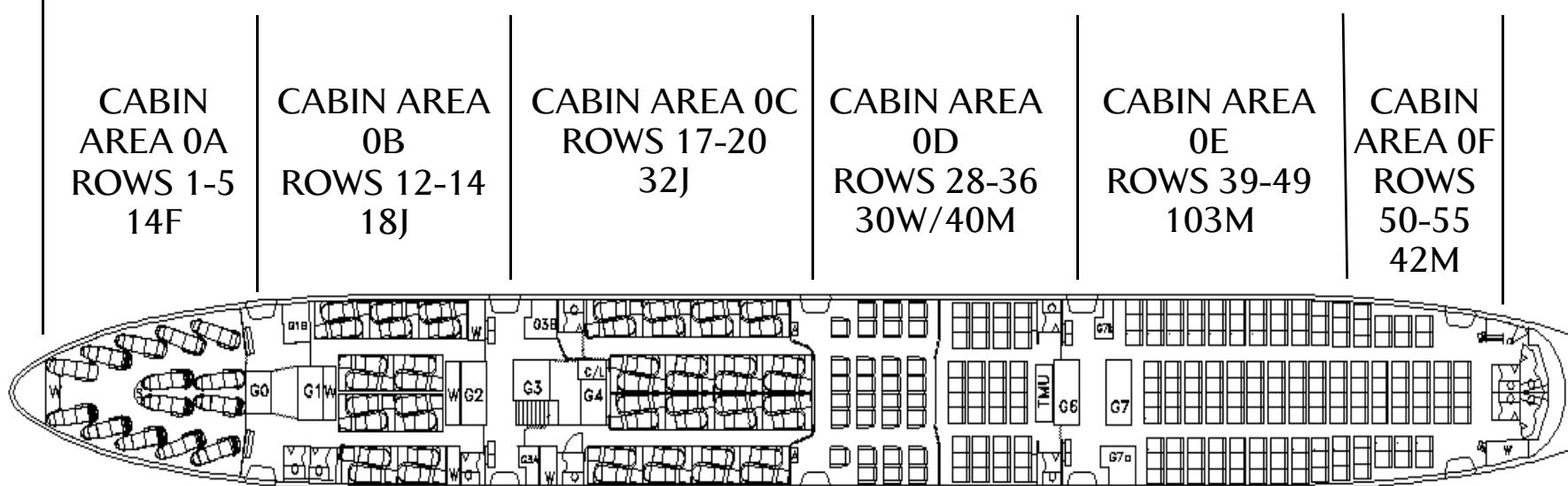
CABIN AREA 0B
ROWS 12-14
18J

CABIN AREA 0C
ROWS 17-20
32J

CABIN AREA 0D
ROWS 28-36
30W/40M

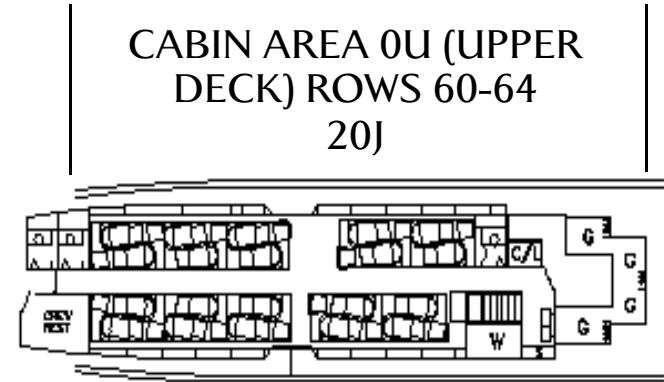
CABIN AREA 0E
ROWS 39-49
103M

CABIN AREA 0F
ROWS 50-55
42M

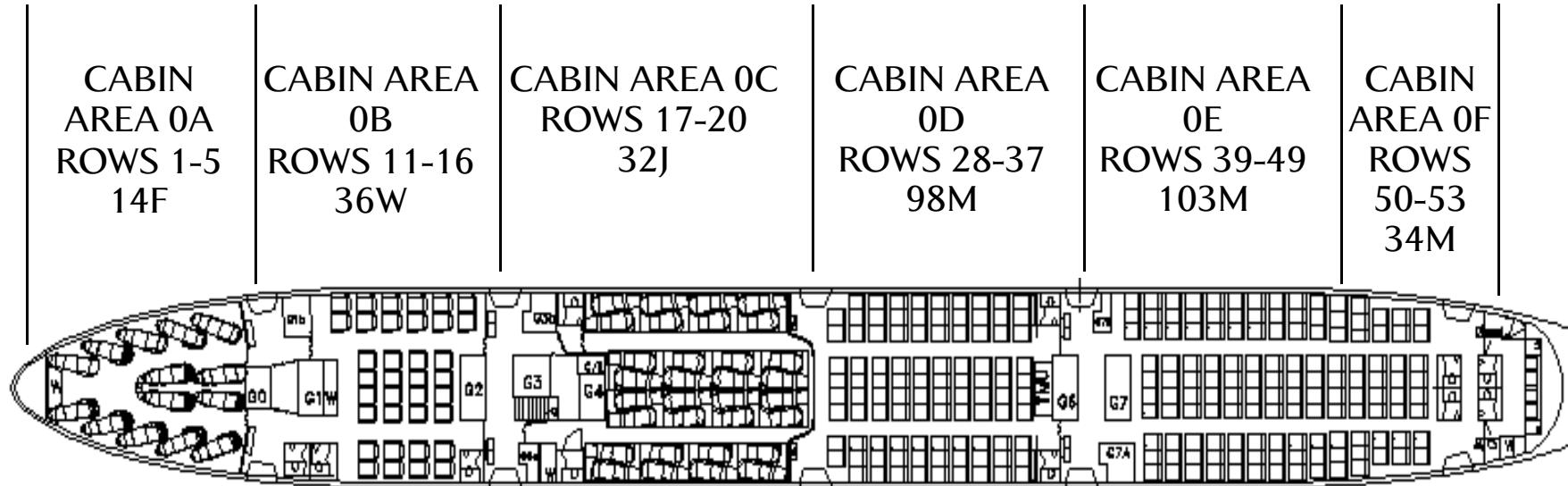


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Figure 3 MID-J Stretch Fitted Interior 14F52J36W235M..74I.C and 14F52J36W235M..74J.C



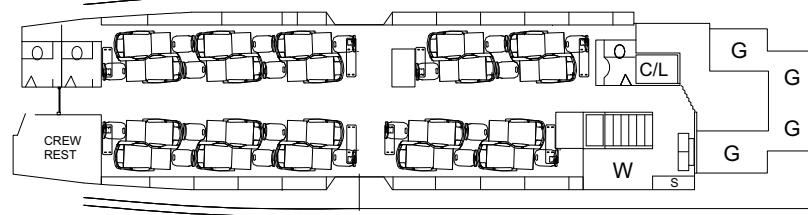
**B747-436 Fitted Interior:
14F52J36W235M..74I.C
14F52J36W235M..74J.C**
**MAXIMUM APPROVED PASSENGER
SEATING CONFIGURATION:**
337 SEATER



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Figure 4 Super Hi-J Fitted Interior F14J86W30M145..74S.C

CABIN AREA 0U (UPPER DECK) ROWS 60-64
20J



B747-436 Fitted Interior: F14J86W30M145..74S.C

MAXIMUM APPROVED PASSENGER SEATING CONFIGURATION:
275 SEATER

CABIN AREA 0A
ROWS 1-5
14F

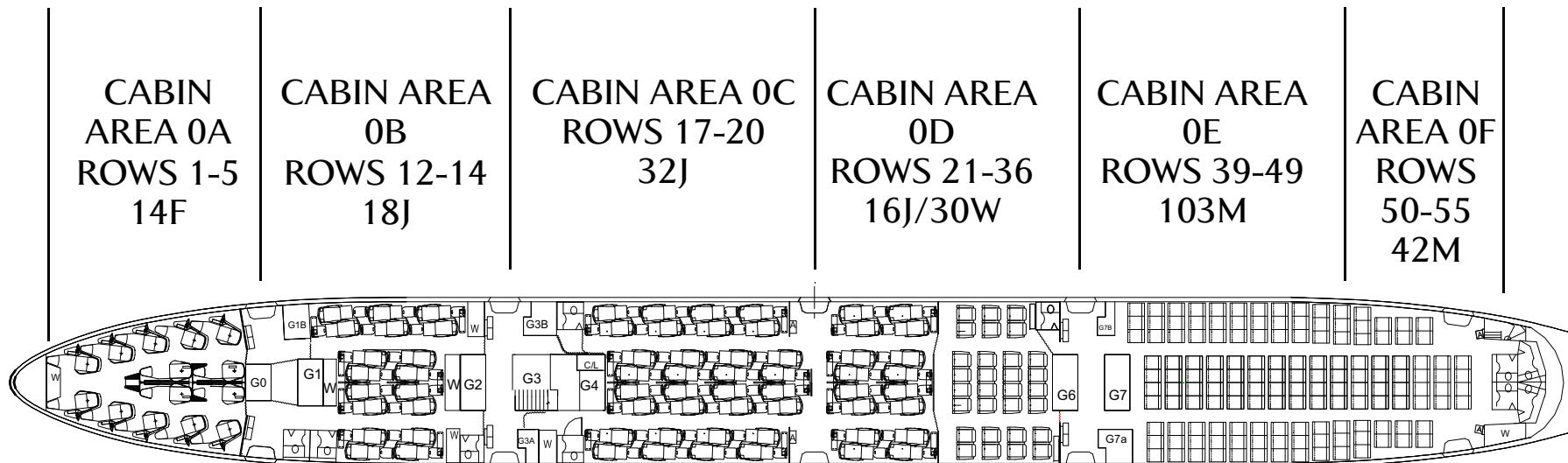
CABIN AREA 0B
ROWS 12-14
18J

CABIN AREA 0C
ROWS 17-20
32J

CABIN AREA 0D
ROWS 21-36
16J/30W

CABIN AREA 0E
ROWS 39-49
103M

CABIN AREA 0F
ROWS 50-55
42M



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2.2 Aircraft Version and Configuration Codes

2.2.1 Fitted Interior: 14F70J30W177M..74G.C

Aircraft Type	Aircraft Version Code	Config	Class	Rows
744	74B	14F/70J/30W/177M	F J W M J	1-5 12-20 28-31 33-53 60-64
744	74E	0F/84J/30W/177M	F J W M J	1-5 12-20 28-31 33-53 60-64
744	74J	84J/30W/177M	J W M J	1-20 28-31 33-53 60-64

2.2.2 Fitted Interior: 14F70J30W185M..74K.C and 14F70J30W185M..74P.C

Aircraft Type	Aircraft Version Code	Config	Class	Rows
744	74A	14F/70J/30W/185M	F J W M J	1-5 12-20 28-31 33-55 60-64
744	74D	0F/84J/30W/185M	F J W M J	1-5 12-20 28-31 33-55 60-64
744	74H	84J/30W/185M	J W M J	1-20 28-31 33-55 60-64

2.2.3 Fitted Interior: 14F52J36W235M..74I.C and 14F52J36W235M..74J.C

Aircraft Type	Aircraft Version Code	Config	Class	Rows
744	74C	14F/52J/36W/235M	F J W M J	1-5 17-20 11-16 28-53 60-64
744	74F	0F/66J/36W/235M	F J W M J	1-5 17-20 11-16 28-53 60-64
744	74G	66J/36W/235M	J W M J	1-20 11-16 28-53 60-64

2.2.4 Fitted Interior: 14F86J30W145M..74S.C

Aircraft Type	Aircraft Version Code	Config	Class	Rows
744	74K	14F/86J/30W/145M	F J W M J	1-5 12-22 33-36 39-55 60-64



SECTION 3 LOAD AND BALANCE

3.1 Loadsheets

3.1.1 General

All Loadsheets must conform to IATA Recommended Practices.

British Airways uses the following types of Loadsheets:

- Four Sector – Manual (T978/A5991). Completed example later in this section.
- EDP Loadsheet – Departure Control System. Completed example later in this section.
- EDP Loadsheet – Provisional Version, plus Updates. Completed examples later in this section.

3.1.2 Distribution of Copies

To comply with Statutory and British Airways' requirements, copies of Loadsheets must be distributed as follows:

Original To be retained on departure airport file with a copy of the Balance Chart (if applicable). These copies must be retained for a minimum statutory period of six months.

One Copy To be retained by the Captain for attachment to the service flight plan.

Note: If a transit station removes this loadsheet from the aircraft for any purpose, they must ensure it is returned to the Captain.

Certain stations are required to send a copy of the loadsheet to Revenue Accounts.

For a list of these stations see Ground Operations Manual.

3.1.3 Accuracy Standards

Transit Stations may carry forward load details from the previous Station's Loadsheet, but must check information with the incoming Load Message to avoid repetition of errors. If an error in the Traffic Load is apparent, the appropriate cross checks must be made to locate the error. Where the previous station's loadsheet is a 'Provisional Version,' then load details from the incoming load message must be used.

3.1.4 Compilation of Manual Loadsheets

3.1.4.1 Introduction

The next few pages contain details on the compilation of a manual Loadsheet. This is intended to be an aid to those who find themselves having to do a manual Loadsheet instead of a DCS one. It is not written as a Training document and only compliments what you have been taught by Load Control Training or your Line Trainer. It will be of use to Flight Crews, who may find them have no option but to write a Loadsheet themselves.

3.1.4.2 A Blank Loadsheet

Appendix 1 shows a blank loadsheet, which contains numbers 1–26 in various boxes. Items 1–2, 4–6, 10–12 are found in the LBM. Item 3 is taken from the Weight Schedule. Items 8 and 13 are from Cirrus. Items 14–23 involve final figures. Taking each of these numbers in turn you can now start to complete the loadsheet.

The loadsheet can be viewed as a two stage operation. The first stage includes calculation of the Dry Operating Weight, Operating Weight and allowed traffic load.

The second stage is the completion of final figures.

3.1.4.3 Completing the Blank Loadsheet from the Top Left Hand Side

The flight number and aircraft registration are self explanatory.

1. **The Version.** This is found in the LBM [Section 1.5.1](#).
2. **Crew.** This the number of crew operating and is shown as Pilots/Cabin crew. e.g. 2/15.
3. **Basic Weight and Index.** This is obtained from the weight schedule.
4. **Crew Weight and Index.** This is detailed in the LBM [Section 1.5.4](#).
5. **Pantry Weight and Index.** This weight and index is detailed on the Intranet. The local station ground staff can advise the correct Badge product code to use.
6. **Used for Service Weight Adjustments.** For example, potable water, ballast fuel.
7. **Dry Operating Weight.** Basic weight plus crew plus pantry plus any service weight adjustment Sum of items 3+4+5 on the blank loadsheet.
8. **Take-off Fuel.** This is CIRRUS Fuel, (Total Fuel - Taxi Fuel).



9. **Operating Weight.** Dry Operating Weight plus take-off fuel. Items 7+8.
10. **Maximum Zero Fuel Weight.** LBM [Section 1.1](#).
11. **Maximum Take-off Weight.** LBM [Section 1.1](#).
12. **Maximum Landing Weight.** LBM [Section 1.1](#).
13. **Trip Fuel.** This is taken from the CIRRUS flight plan.
14. **Passenger Breakdown.** This is can be shown as:-Male/Female/ Child/Infant or as Adults/Children/Infants. Both are by Destination.
15. **Cabin Baggage.** Only used for large amount of Cabin Baggage or other specially authorised items, after consultation with the Captain
16. **Baggage.** The final baggage figures, total and the compartment(s) location. Standard Weights ([Section 3.1.4.11](#)) If actual weights are used the statement at the bottom of the Loadsheets should be deleted. Individual items in excess of 25 kg ([Section 3.1.4.11](#)), Specially authorised cabin loaded baggage, Guide Dogs ([Section 3.3.2.2](#)) and Diplomatic Mail ([Section 3.4.3](#)). The Actual weight of these items should be added to the Baggage Weight and shown in Cpt 0 (ULD Tare weight procedures ([Section 3.1.4.16](#)).
17. **Cargo.** This will is the cumulative total of cargo in each compartment by destination.
18. **Mail.** This will is the cumulative total of cargo in each compartment by destination It includes Diplomatic Mail in the Security Locker. Show this in Cpt 0.
19. **Distribution of Deadload.** All cargo, mail and baggage to be shown in the appropriate compartment. As per the LIRF (Loading Instruction Report Form).
20. **Remarks.** See Appendix A for a list of codes that can be used on the LDM.
21. **Total Deadload.** Total weight of all Cargo, Mail, Baggage, EIC and COU, for all destinations.
22. **Passenger Weight.** Standard passenger weights should be used. LBM [Section 3.1.4.12](#). If actual passenger weights are used delete the appropriate statement at the bottom of the Loadsheet.
23. **Total Traffic Load.** This is the total deadload plus the total passenger weight.



-
24. **Last Minute Changes (LMC).** Action any as required and amend ZFW, TOW and LW, when LMC exceeds 500 kg. Check that Maximum's are not exceeded. LMCs are not permitted for Fuel changes in the LMC box.
 25. **Balance and Seating Conditions.** The LIZFW and the Stab setting are obtained from the appropriate balance chart, LBM *Section 3.4.5.*
 26. **Supplementary Information (SI).** Enter the Basic Weight and Basic Index.

3.1.4.4 Operating Weight Calculation

We can now look at the calculation of the Dry Operating Weight, allowed traffic load and general preparation of the loadsheet. See [Appendix 2](#).

Using a copy of the load and balance manual we can see how each step was arrived at:

- a. **Flight number** and registration are self explanatory.
- b. **Version** is cabin configuration by Class.
- c. **Crew** is the operating number of Pilots/Cabin crew.
- d. **Calculation of Dry Operating and Operating Weight.**

Basic weight		1	7	9	1	6	8
Crew				1	5	6	7
Pantry				6	7	0	1
Dry operating weight		1	8	7	4	3	6
Take-off fuel		1	1	0	0	0	0
Operating weight		2	9	7	4	3	6

Example 1

- e. **Basic Weight and Index.** This is taken from the weight schedule.
- f. **Crew Weight and Index** is from LBM page WB-1-17.
- g. **Pantry Weight and Index** is from CLC.
- h. **Item 6 Spare Line**, is used for service weight adjustments e.g. potable water, ballast fuel.

- i. **Dry Operating Weight (DOW)** is the Sum of the basic weight, crew, pantry weights, and any service weight adjustments including potable water. This figure is also repeated towards the bottom of the loadsheet just above the zero fuel weight. See blank loadsheet item number 7.
- j. **Operating Weight** is Take-off Fuel plus DOW The take-off fuel is in three locations on the loadsheet.
- k. **Maximums Weights.** Enter these for ZFW, TOW and LW. LBM on page 01-01-01, or from Sword. They each appear twice on the loadsheet. Item numbers 10, 11, 12.

3.1.4.5 Allowed Traffic Load Calculation

Maximum weight for	Zero fuel		Take-off	Landing	
	2 4 6 7 5 0			2 8 5 7 6 0	
Take-off fuel	1 1 0 0 0 0		Trip Fuel	9 7 0 0 0	
	a	b	c		
Allowed take-off weight (lowest of a b c)	3 5 6 7 5 0	3 9 4 6 2 0	5 8 2 7 6 0		
Operating weight	2 9 7 4 3 6				
Allowed traffic load	5 9 3 1 4				

Example 2

- a. **Add** the Take-off Fuel to the Maximum Zero Fuel Weight to give a value for a.
- b. **Enter** the Maximum Take off Weight in b, or RTOW.
- c. **Add** the Trip Fuel to the Maximum Landing Weight to give a value in c.
- d. **Take** the lowest of a, b, or c. From the lowest deduct the Operating Weight The result is the Allowed Traffic Load.

3.1.4.6 Preparing the Loadsheets

- a. Enter the destination/s on the left hand column (Dest). See [Appendix 2](#).
- b. In the SI Box (Supplementary Information) enter the Basic Weight and Index. See [Appendix 2](#).
- c. In the Balance and Seating condition box set out the requirements for your aircraft type and the cabin area indicators e.g. as per box 22 on the blank loadsheet. See [Appendix 2](#).

3.1.4.7 Introduction of the Final Figures ([Appendix 3](#))

a. Deadload Finalisation (Cargo, Mail and Baggage)

The final figures for cargo, mail and passenger baggage and the relevant compartment locations. Fill this information in as per the Example 3 below.

				1	2	3	4	5	6	0	
L				Tr							
H				B	6	5	2	0	4760	1760	
R				C	1	6	2	6	8	2509	4478
	150	140	12	M						8381	900
				T						57	61
	150	140	12							10	0
					2	2	7	8	8	4269	4478
										12	40
										300	

Example 3

The code for the above items of deadload are:

Tr Transit deadload, **B** Baggage, **C** Cargo, **M** Mail.

Also note the Vertical and horizontal cross check of figures, e.g. 4760+4269+4478+8381+900 cross check with 6520+16268 This section is now complete.

b. Final Passenger Figures and Weight

Dest	M	A/F	CH	Inf							
L					Tr						
H					B	6	5	2	0		
R					C	1	6	2	6	8	
	150	140	12		M						
					T						
	150	140	12			2	2	7	8	8	
					Total passenger weight	+	2	3	4	2	0

Example 4

The final passenger figures show 150 Males and 140 Females with 12 Children. For LHR using the standard passenger weights on Standard Passenger Weights [Section 3.1.4.12](#).

3.1.4.8 Total Traffic Load to Landing Weight (TTL to LW)

- Total Traffic Load** equals the Total Deadload obtained in 6a. added to the Total Passenger Weight, obtained in 6b.
- Check** this figure is less than the Maximum Allowed Traffic Load.

- c. **Underload before LMC.** Subtract Actual Traffic Load from the Allowed Traffic Load.
- d. **ZFW** equals DOW + TTL, check this against the MZFW.
- e. **Take-off Weight** equals ZFW plus Take-off Fuel. Compare this to MTOW.
- f. **Actual Landing Weight:** subtract the Trip Fuel from the Actual Take-off Weight Compare to MLW.
- g. **Example 5 shows this.**

Total passenger weight	+	2	3	4	8	0	Allowed traffic load	5	9	3	1	4	
Total traffic load	=	4	6	2	0	8		4	6	2	0	8	
Dry operating weight	+	1	8	7	4	3	6	Underload before LMC	1	3	1	0	6
Zero fuel weight	LMC	2	3	3	6	4	4	last minute changes					
Max	+/-	=						specification	cl /	+ weight			
2 4 6 7 5 0	+/-	=						Dest	M-F-CD-INF	B-C-M	cpt	-	
Take-off fuel		1	1	0	0	0	0						
Take-off weight	LMC	3	4	3	6	4	4						
Max	+/-	=											
3 9 4 6 2 0	+/-	=											
Trip fuel	(-)	9	7	0	0	0							
Landing weight	LMC	2	4	6	6	4	4						
Max	+/-	=						LMC total + / -					
2 8 5 7 6 0	+/-	=											

Authorised weights used for passengers and baggage

Example 5.



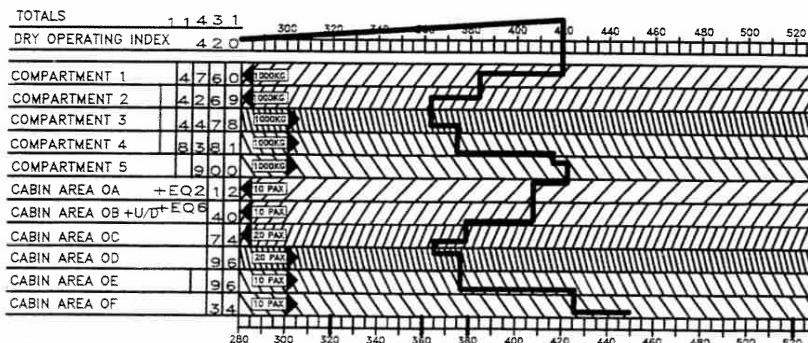
3.1.4.9 Completion of Balance Chart ([Appendix 4](#))

Make sure you choose the correct balance chart for your configuration.

- Annotate the Basic Index, Crew and Pantry index effects on the balance chart.

	-	+		
BASIC INDEX			4 3 1	
CREW				
PANTRY			1 1	
TOTALS			1 1 4 3 1	
DRY OPERATING INDEX			4 2 0	

- Annotate the deadload for each compartment and cabin area passenger split.
- Balance Chart commence at the DOI by dropping a vertical line to the first compartment with deadload in. Where the vertical line bisects the compartment line stop and draw in the compartment load value in the appropriate direction. Each area has an arrow indicating the direction, attached to a box with a segment value.



- d. After completing the last cabin area drop a vertical line to the bottom of the CC envelope. Mark the ZFW on this line, note the laden index zero fuel weight (L I Z W) and write the value in the LIZFW box.
- e. **Fuel Index Correction** – Calculate this, and write in the next box, annotate if it is Positive (+) or negative (-) value.
- f. **Laden Index at Take-off (LITOW)**, Now calculate the LITOW by adding or subtracting the fuel index correction value from the LIZFW.
- g. **An Example of a Balance Chart** follows. See Example ([Appendix 4](#)).

3.1.4.10 Final Loadsheets Data from the Balance Chart ([Appendix 3](#) and [Appendix 4](#))

1. **Cabin Area Split** Write this on the loadsheet.
2. **Data required from the Balance Chart** is Aircraft Type Dependent e.g. **LITOW Stab Setting**.
3. The balance chart will be self explanatory.
4. Finally print name and licence number and sign the loadsheet in the box marked prepared by.

Appendix 1

Loadsheet and loadmessage													
Passenger aircraft													
All weights in kilos													
Date													
FLIGHT	A/C REG.			L D M									
CREW	(1)		CREW		(2)								
Basic weight	(3)	Maximum weight for			Zero fuel	(10)	Take-off	Landing					
Crew	(4)												
Pantry	(5)	Take-off fuel			(6)		Trip Fuel	(13)					
Dry operating weight	(7)	Allowed take-off weight (lowest of a b c)											
Take-off fuel	(8)	Operating weight			(9)								
Operating weight		Allowed traffic load											
Dest	Nr. of passengers	Cab		Total	1	2	3	4	5	6	0	PAD	PAX
M	A / F	C	H	Inf/bag									
<u>T_r</u>													
← (14) → (15)		← (16) → (17)				→ (18) ←						pax/ / / pad/ / / (20)	
<u>T_r</u>													
← (18) →		1/ 2/ 3/ 4/ 5/ 6/ 0/											
<u>T_r</u>													
← (19) →		← (20) → (21)											
<u>T_r</u>													
← (20) → (21)		← (22) →											
<u>T_r</u>													
← (21) →		← (23) →				→ (24) ←						SI (26)	
<u>T_r</u>													
Total passenger weight + (25) Allowed traffic load SI													
= (23) = (26)													
Total traffic load + Underload before LMC = Notes (26)													
Dry operating weight + LMC specification cl / + weight													
Zero fuel weight +/- (26) Dest M-F-CD-INF B-C-M cpt - Notes													
Max (10) +/- = (26) Balance and seating conditions (26)													
Take-off fuel LMC (26) Passengers/inf (26)													
Take-off weight +/- (26) = (26) Prepared by													
Max (11) +/- = (26) Approved by													
Trip fuel LMC (26) = (26)													
Landing weight +/- (26) = (26) LMC total + -													
Max (12) +/- = (26) Authorised weights used for passengers and baggage													
Check LMC total with addendum													

Appendix 2

								Loadsheet and loadmessage	
								Passenger aircraft	
								All weights in kilos	Due
								01-May-00	
FLIGHT	A/C REG.	VERSION	L	D	M	CREW			
B A S S S S	GB NLA	H GGA				E 1 7 5			
Basic weight:	1 7 9 1 6 8	Maximum weight for		Zero fuel		Take-off		Landing	
Crew	1 5 6 7			2 4 6 7 5 0			2 5 5 7 6 0		
Pantry	6 7 0 1	Take-off fuel		1 1 0 0 0 0			Trip Fuel	9 7 0 0 0	
Dry operating weight	1 8 7 4 5 6	Allowed take-off weight (lowest of a b c)		3 5 6 7 5 0 5 9 4 6 8 0 5		2	8 2 7 6 0		
Take-off fuel	1 1 0 0 0 0	Operating weight		2 9 7 4 3 6					
Operating weight	2 9 7 4 5 6	Allowed traffic load		5 9 5 1 4					
Dest	Nr of passengers	Cab Total							
			1	2	3	4	5	6	0
M	A / F / C / H	In/bag							PAX PAD
			Tr						
			B						
			C						
			M						
			X						
				11	21	31	41	51	61
									.01
L			Tr						
H			B						
R			C						
			M						
			X						
Total passenger weight	+/-	Allowed traffic load		5 9 5 1 4	S I B W	1 1 1 1 1 1			
Total traffic load	=				B I	451			
Dry operating weight	+/-	1 8 7 4 5 6	Underload before LMC	=					Notes
Zero fuel weight	LMC			=					
Max	+/-	=	last minute changes						
2 4 6 7 5 0 +/-	=		specification	c1 /	+ weight				Balance and seating conditions
Take-off fuel		1 1 0 0 0 0	Dest M-F-CD-INF B-C-M cpt -						
Take-off weight	LMC								
Max	+/-	=							
3 9 4 6 8 0 +/-	=								
Trip fuel		9 7 0 0 0 0							
Landing weight	LMC								
Max	+/-	=	LMC total + -						
2 8 5 7 6 0 +/-	=								
			Authorised weights used for passengers and baggage						

Appendix 3

APPENDIX 1												Loadsheet and loadmessage												
												Passenger aircraft												
												All weights in kilos												
FLIGHT						A/C REG.			VERSION			CREW												
B A S F F S J						G B N L A			H 4 G A			E / I S												
Basic weight	1	7	9	1	6	8	Maximum weight for			Zero fuel		Take-off	Landing											
Crew							2	4	6	7	5	0	2	5	7	6	0							
Pantry							6	7	0	1	0	0	9	7	0	0	0							
Dry operating weight	1	8	7	4	3	6	Allowed take-off weight (lowest of a b c)			9	5	6	7	5	0	3	5	2	7	6	0			
Take-off fuel TAXI 1000	1	1	0	0	0	0	Operating weight			2	9	7	4	3	6	9	7	4	3	6	0			
Operating weight	2	9	7	4	3	6	Allowed traffic load			5	9	3	1	4										
Dest	Nr of passengers	Cab	Total				1	2	3	4	5	6	0	PAX	PAD									
M	A / P	CH	In bag																					
				Tr																				
				B																				
				C																				
				M																				
				T			1	2	3	4	5	6	0											
L	H	R																						
150	140	12					B	6	5	2	0	4760	1760					12	40	300	0	1	1	
							C	1	6	2	6	8	2509	4478	8381	900								
							M																	
							T																	
Total passenger weight	+/-						2	3	4	2	0	0	Allowed traffic load	5	9	3	1	4	SIB-W	17775				
Total traffic load	=						4	6	2	0	8				4	6	2	0	5	B1	491			
Dry operating weight	+/-						1	8	7	4	3	6	Underload before LMC	=	1	3	1	0	6					
Zero fuel weight	LMC						2	3	3	6	4	4	Last minute changes											
Max	+/-												specification	c1 /	+/-									
													Dest	M-F-CD-INF	B-C-M	cpt	-							
Take-off fuel							1	1	0	0	0	0												
Take-off weight	LMC						3	4	5	6	4	4												
Max	+/-																							
Trip fuel							(-)	9	7	0	0	0												
Landing weight	LMC						2	4	6	6	4	4												
Max	+/-												LMC total + / -											

Authorised weights used for passengers and baggage

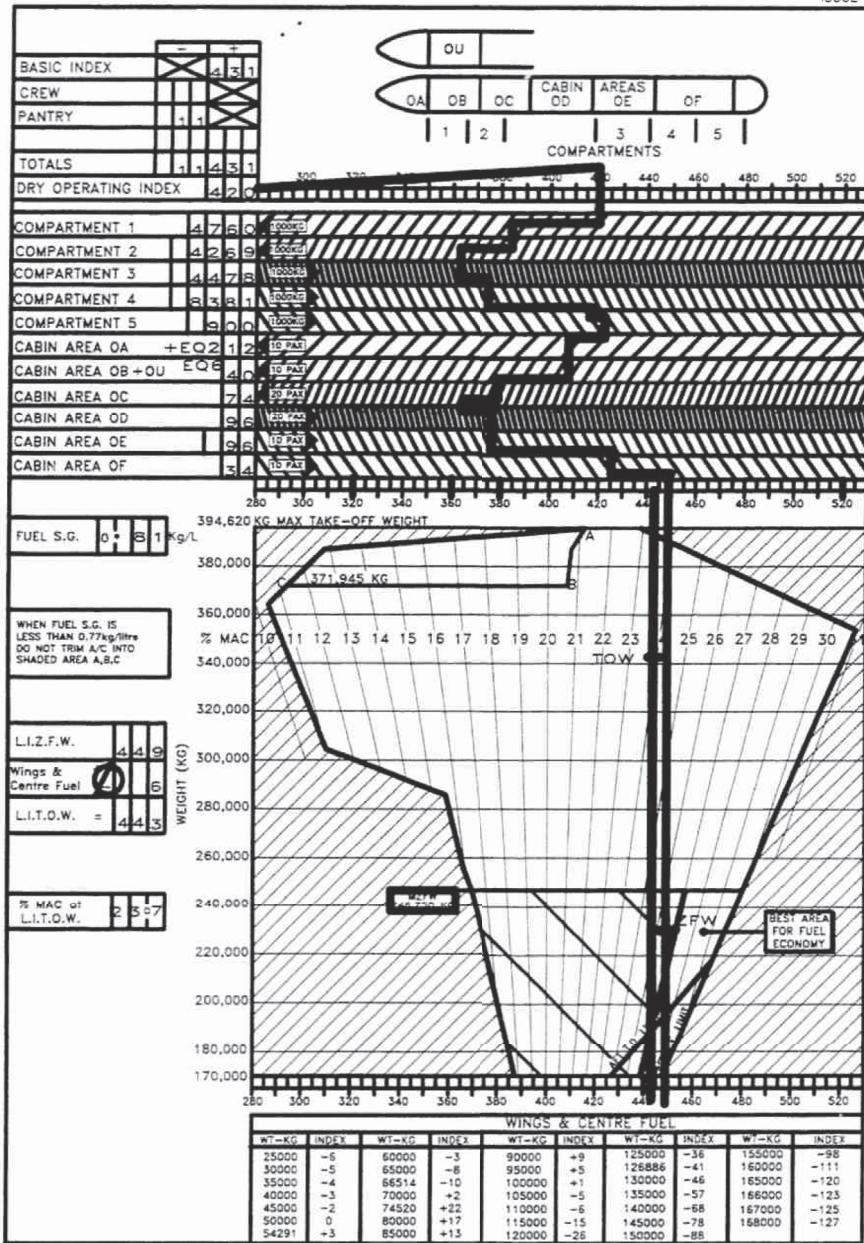
Notes
TAIL TANK/NIL SG 0.200
Balance and seating conditions
DOI 490 LIZFW 449
LITOW 443
MACTOW 23.7%
A12+(eq2) B40+(eq6) C74
D96 E96 F34
Passengers/inf 352
Check LMC total with underload
Prepared by 
KEVIN DOYLE QXD10
Approved by 

Appendix 4

B747-436 Standard
No Tail Tank Fuel Balance Chart

No. 744/1

ISSUE Q





3.1.4.11 Standard Baggage Weights

(For Standard Instructions see Ground Operations Manual).

Standard Baggage Weights can be used for both Load and Trim purposes, with certain exceptions as detailed below in *Section – A. Exceptions to Using Standard Weights*. The subsequent sections specify the correct baggage weights to be used for different types of flights and destinations.

A. Exceptions to Using Standard Weights

1. This procedure does not apply if actual passenger and cabin baggage weights are used.
2. This procedure applies to hold baggage. Actual weights are still required on some aircraft for cabin loaded baggage such as diplomatic mail, musical instruments and other valuable or delicate items; these are from time to time cabin loaded by special arrangement with the passenger. The weights of such items should be included in the 'B' Baggage entry and column '0' for Loadsheets purposes.
3. This procedure is not applied at BRUSSELS/GENEVA/ZURICH where our handling agents use actual weights.
4. This procedure does not apply if a significant number of passengers check in baggage that is expected to exceed the standard baggage weight. In this case, actual weights must be used or an adequate weight increment added.
5. This procedure does not apply when planning indicates that use of the standard weight is likely to cause load refusal. In this situation actual weights should be used and Passenger Section warned. Do not revert to the standard weight, if this proves less than the actual weight.

B. Publicly Scheduled Flights

Publicly Scheduled Flights	Standard Baggage Weights per Piece	Conditions
Entirely within the United Kingdom (except * below)	11 kg	–
* Domestic Routes To/From LHR/ LGW	13 kg	–
Entirely within Europe	14 kg	See <i>Note 1</i> :
Longhaul	16 kg	See <i>Note 2</i> :

C. Inclusive Tour Passenger Flights

Inclusive Tour Passenger	Standard Baggage Weights per Piece	Conditions
Shorthaul Flights	13 kg	–
Intercontinental Flights	16 kg	–

D. 'Sole-Use' Charters Flights

'Sole-Use' Charter Flights	Standard Baggage Weights per Piece	Conditions
Entirely within United Kingdom and Republic of Ireland	11 kg	–
Entirely within Europe	13 kg	See Note 3:
Longhaul	16 kg	–

Note 1: On international through flights making an intermediate stop within the UK, and where no weight limitations are anticipated, the weight of 14 kg per piece is to be used for pieces accepted from passengers travelling over the internal sector. Optionally, whenever weight limitations are anticipated, the lower weight of 13 kg can be used for pieces accepted from passengers travelling over the internal sectors.

Note 2: On longhaul through flights making an intermediate stop within the UK or Europe, the weight of 16 kg per piece is to be used for pieces accepted from passengers travelling over the internal or European sector. Optionally, whenever weight limitations are anticipated, the lower weights can be used for pieces accepted from passengers travelling internally over the internal and European sectors (13 kg and 14 kg respectively).

Note 3: The following conditions must be met:

1. The aircraft has a seating capacity for more than 40 passengers.
2. The baggage is characteristic of that carried on scheduled and holiday journeys wholly within Europe.
3. Actual weights are used for non-characteristics pieces (for example – musical instruments, film equipment and theatrical properties). The decision as to the BA Station Superintendent, BA Representative or BA Duty Manager.

-
4. If possible avoid a *Loadsheet* total baggage weight which represents a combination of actual and standard weights.

E. Ski Equipment Weights

When large quantities of ski equipment are carried, it is permissible to use the notional weights, shown below:

Item	Weight (kg)
Skis	12 kg
Boot bag	7 kg
Snowboard	17 kg

F. Baggage Weight Calculations

Where a computerised loadsheet uses "Bay Trim" to calculate the balance for the deadload, the baggage figures must be finalised for each ULD rather than by compartment.

The hold baggage weight entry for laden weight and balance purposes is calculated by multiplying the number of pieces by the standard weight. Where actual baggage weights are being used the individual bay or compartment weights should be calculated as follows:

1. Divide the total baggage weight by the total number of pieces to establish an average weight Per bag,
2. Multiply the number of pieces in each bay or compartment by the average weight per bag established in step i above.

G. Loading Instruction/Reports

Baggage entries on these forms may be expressed in number of pieces, or equivalent standards weights.

H. Loading Precautions

When the hold baggage for any destination is distributed in more than one hold, the pieces required for each hold must be selected so that the baggage loaded in each hold is a good mixture by size and weight.

On occasions, **Abnormally Heavy** pieces may be included in the load.



When, in the judgement of the Loading Supervisor, Duty Officer or other person supervising the loading, the baggage load includes pieces which have an apparent weight of more than 25 kg, the Captain must be told; they retain the right to require the use of actual weights for such heavy pieces if, in their opinion, this is necessary for safety.

Abnormally heavy individual pieces in excess of those quantities must be loaded in a different hold, the selection of which must be approved by Load Control.

I. Loadsheet Endorsements

When standard passenger weights and baggage are used the *Loadsheets* must be endorsed "**Authorised weights used for passengers, crew and baggage**".

This is a legal requirement and is pre-printed on British Airways *Loadsheets*. When actual weights are used the 'Notes' box must be annotated or the pre-printed endorsement amended accordingly.

3.1.4.12 Standard and Adult Passenger Weights

(For Standard Instructions see Ground Operations Manual [5.6.1.3](#))

A. Longhaul Flights

- Except Flights to/from West Africa (ABV/ACC/LOS) (See [Standard and Adult Passenger Weights](#)).
- Except Charter Flights (See [Standard and Adult Passenger Weights \(Charter Flights\)](#)).

B. Standard Passenger Weights

Table A shows the **Standard Passenger Weights** to be used for passengers on longhaul flights. These weights include an approved unchecked baggage allowance (shown in brackets).

Table A

Passenger	All Classes	
	Total (kg)	Bags (kg)
Adult Male	91	(9)
Adult Female	73	(9)
Child	38	(9)
Infant	0	(-)



Note: Infants occupying separate passenger seats must be considered as children.

C. Adult Male/Female Passenger Weights

Alternatively, Table B shows the Adult Male/Female Passenger Weights to be used for passengers on longhaul flights. These weights include an approved unchecked baggage weight allowance (shown in brackets).

These weights may only be used providing:

1. There are no capacity problems.
2. On multi-sector flights, either M/F/C/I weights are used OR A/C/I weights are used. Combinations of M/F/C/I and A/C/I weights may not be used on different sectors of a multi-sector flight.
3. On multi-sector flights where all Loadsheets are produced manually, there is no weight-limited sector.

Table B

Passenger	All Classes	
	Total (kg)	Bags (kg)
Adult Male/Female	87	(9)
Child	38	(9)
Infant	0	(-)

Note: Infants occupying separate passenger seats must be considered as children.

3.1.4.13 Standard and Adult Passenger Weights

(Flights to/from West Africa (ABV/ACC/LOS))

A. Standard Passenger Weights

Table A shows the Standard Passenger Weights to be used for passengers on flights to/from West Africa (ABV/ACC/LOS). These weights include an approved unchecked baggage weight allowance (shown in brackets).

Table A

Passenger	All Classes	
	Total (kg)	Bags (kg)
Adult Male	95	(13)

Passenger	All Classes	
	Total (kg)	Bags (kg)
Adult Female	77	(13)
Child	42	(13)
Infant	0	-

Note: *Infants occupying separate passenger seats must be considered as children.*

B. Adult Male/Female Passenger Weights

Alternatively, Table B shows the Adult Male/Female Passenger Weights to be used for passengers on flights to/from West Africa (ABV/ACC/LOS). These weights include an approved unchecked baggage weight allowance (shown in brackets).

These weights may only be used providing:

1. There are no capacity problems.
2. On multi-sector flights, either M/F/C/I weights are used **or** A/C/I weights are used. Combinations of M/F/C/I and A/C/I weights may not be used on different sectors of a multi-sector flight.
3. On multi-sector flights where all Loadsheets are produced manually, there is no weight-limited sector.

Table B

Passenger	All Classes	
	Total (kg)	Bags (kg)
Adult Male/	91	(13)
Child	42	(13)
Infant	0	-

Note: *Infants occupying separate passenger seats must be considered as children.*

3.1.4.14 Standard and Adult Passenger Weights (Charter Flights)

A. Standard Passenger Weights

Table A shows the **Standard Passenger Weights** to be used for Charter Flight passengers. These weights include an approved unchecked baggage allowance (shown in brackets).

Table A

Passenger	All Classes	
	Total (kg)	Bags (kg)
Adult Male	86	(9)
Adult Female	72	(9)
Child	38	(9)
Infant	0	(-)

Note: Infants occupying separate passenger seats must be considered as children.

B. Adult Male/Female Passenger Weights

Alternatively, Table B shows the Adult Male/Female Passenger Weights to be used for Charter Flight passengers. These weights include an approved unchecked baggage allowance (shown in brackets).

These Weights may only be used providing:

1. There are no capacity problems.
2. On multi-sector flights, either M/F/C/I weights are used OR A/C/I weights are used. Combinations of M/F/C/I and A/C/I weights may not be used on different sectors of a multi-sector flight.
3. On multi-sector flights where all Loadsheets are produced manually, there is no weight-limited sector.

Table B

Passenger	Charter Class	
	Total (kg)	Bags (kg)
Adult Male/Female	79	(9)
Child	38	(9)
Infant	0	(-)

Note: Infants occupying separate passenger seats must be considered as children.

C. Allowances for Passengers Exceeding Standard Passenger Weights

When a flight is identified as carrying a significant number (in excess of 10% of the total seating capacity) of passengers whose weight, including unchecked baggage, is expected to exceed the Standard Passenger Weight, this extra weight must be accounted for on the loadsheet. This

can be done either by using the actual weight of these passengers, or by adjusting the total passenger weight by adding 15 kg for each member of the group, and adjusting the index accordingly.

3.1.4.15 Special Fuel Conditions

A. Centre Tank Fuel As Ballast

Not applicable to B747-436 aircraft.

B. Non-standard Taxi Fuel

When extra Taxi Fuel in excess of standard figure is uplifted the total Taxi Fuel figure must be added to the Take-off Weight to ensure the Maximum Taxi Weight is not exceeded.

The Maximum Taxi Weight must be entered in the 'Notes' box of the loadsheet together with the endorsement '**Non-standard Taxi Fuel**'.

C. Non-standard Fuel Loading

When a Non-standard Fuel loading condition exists, the actual fuel uplift must be indicated in the 'Notes' box of the loadsheet.

3.1.4.16 Location of ULD Tare Weights on Loadsheet

A. Laden Baggage ULDs

Enter in the baggage column of the Loadsheet to the destination that the contents of the ULD are destined. The First Class, Service or rummage ULDs should be entered to the final destination.

B. Laden Cargo ULDs

Enter in the cargo column of the loadsheet to the destination that the contents of the ULD are manifested.

C. Laden Mail ULDs

Enter in the mail column of the loadsheet to the destination that the contents of the ULD are manifested.

D. Empty ULDs

Enter in the cargo column of the loadsheet to the next destination. If the empty ULD is destined to a particular destination – enter to that destination.

E. ULDs Carrying Unmanifested Spares Packs, Unmanifested Shingle Ballast, etc.

Enter in the cargo column of the loadsheet to the destination that the contents are destined. The remarks box of the same destination should contain details of the ULD. (e.g.) EIC/ 1 /600 OR. BAL/ 1 /600.

Note: The following information applies to BABs Departure Control System loadsheets.

Above Items A – Laden baggage ULDs

B – Laden cargo ULDs

C – Laden mail ULDs

D – Empty ULDs

Locate the Tare weights of these ULDs using CK category code 'ULD' to the destination described above.

Above Item E – ULDs carrying unmanifested spares packs, unmanifested shingle ballast, etc.

Locate the Tare weights of these ULDs using CK category code 'EIC' or 'BAL' (as appropriate to the contents) to the destination described above. The above tare weights must not be included in the cargo uplift (CE) in the BABs system.

3.1.5 Appendix A – Codes For Use On Loadsheet/LDM

Each code must be preceded by a full stop and followed by an oblique; the Compartment Number after.

The oblique indicates CPT of loading, e.g. AVI/1

ACT ACT – DEEP FROZEN

Thermal certified containers with Active temperature control with Hold/Compartment temperature requirement of 2°C to 8°C where possible

ACT ACT – STANDARD

Thermal certified containers with Active temperature control with Hold/Compartment temperature requirement of 15°C to 25°C where possible

AOG Urgent A/C Spares

AVG Guide Dog in Cabin

AVI Livestock

AVM Livestock in Mail

BAL Ballast; followed by the Compartment and Weight, e.g. BAL/2/250

BCN Baggage Container

BGF First Class Baggage

BGY Economy Class Baggage

CCO Courier as Cargo

CC0 General Cargo

COM Company Mail, followed by the Compartment and Weight, e.g. COM/5/8

COU Courier Baggage, followed by the Compartment, Weight and Pieces e.g. COU/5/50/8

CSU Catering equipment and food supply not used on flight

DIP Diplomatic Mail, followed by the Number of Bags e.g. DIP/I

DIV Diversion Load

EAT Foodstuffs for Human Consumption

ECP Empty Pallets/Containers

EHO Express Handling Cargo



EIC	Equipment in Compartment (not included in the basic weight/index or dry operating weight/index, e.g. loading and lashing equipment, etc.) followed by Compartment and Weight, e.g. EIC/5/200
EMB	Empty Mail Bags
EXB	Ammunition in Baggage
EXP	Expedite Bags (Rush Tag)
FIL	Undeveloped Film
FRG	Unbooked Non-revenue Cargo
FSH	Live Fish
GML	General Mail
HBG	Hand Baggage
HEA	Heavy Item above 150kg per piece; followed by Compartment and Weight, e.g. HEA/1/385 Two or more heavy pieces in the same compartment need to be shown individually: e.g. HEA/1 /196 HEA/1 /204
HEG	Hatching Eggs
HUM	Human Remains in Coffins
ICE	Dry Ice (CO ₂ Solid). Compartment containing Dry Ice; followed by the Compartment and Weight, e.g. ICE/4/70
JNX	Newspapers for a Return Flight
LHO	Living Human Organisms
MAG	Magnetic Material
MIS	infectious Substances in Mail
MUW	Munitions of War
MWB	Munitions of War in Baggage
NIL	No Items loaded for that destination
NWP	Newspapers and Magazines
OBX	Obnoxious Cargo
OCS	OCS Company Mail
PAD	Indicating the number of Rebate Passengers not entitled to a firm reservation, and the number of seats occupied by class. Figure group of each class to be separated by an oblique



	Sequence of classes for PAX. PAD are included in the PAX CM distribution. E.g. PAD/ 1/3 or PAD/0/4
PAX	Club, Economy Class; followed by the number of seat occupying passengers per class. 1-3 numeric per class. Figure group of each class to be separated by an oblique. E.g. PAX/8/26 or PAX/0/35
PCT	Refrigerated Cargo requiring the Hold/Compartment temperature setting to be set at: 2°C to 8°C/LOW/OFF
PEA	Perishable – Articles made from or containing parts of endangered species (CITES)
PEF	Perishable – Flowers
PEM	Perishable – Meat
PEP	Perishable – Pre-Packed Fruit and Vegetables as defined in 3.4.7
PER	Perishable Cargo
PES	Perishable – Fish/Seafood
PET	Pet as Passenger Baggage
PEU	Perishable – Unpacked as defined in 3.4.7
PHA	Room temperature Cargo requiring the Hold/Compartment temperature setting to be set at: 15°C to 25°C/HIGH/ON
PTS	Livestock Pets Passport
RCL	Cryogenic Liquids
RCM	Corrosive Materials
RFG	Compressed Gases – Flammable
RFL	Flammable Liquids
RFS	Flammable Solids
RFW	Dangerous when Wet
RIS	Infectious Substance
RMD	Miscellaneous Dangerous Goods
RNG	Compressed Gases Non-flammable/Non-toxic
ROB	Remaining on Board Load
ROP	Organic Peroxide
ROX	Oxydising Material
RPB	Poison



RPG	Poisonous Gas
RRW	Radioactive Materials (white label) Category I
RRY	Radioactive Materials (yellow label) Categories II and III
RS B	Polystyrene Beads
RSC	Spontaneously Combustible
RXC	Explosive 1.4C (Cargo A/C)
RXD	Explosive 1.4D (Cargo A/C)
RXE	Explosive 1.4E (Cargo A/C)
RXG	Explosive 1.4G (Cargo A/C)
RXS	Explosive 1.4S
SEC	Security Item; followed by Compartment and Number of Items, e.g. SEC/2/4
SOC	Seats occupied by Baggage, Cargo and/or Mail; followed by the Number of Seats occupied Figure group of each class to be separated by an oblique (sequence of classes CM). SOC not included in PAX CM distributions, e.g. SOC/0/9 or SOC/2/4
SOS	Urgent Medical Supplies
SPB	Special Bags
SWP	Sporting Weapons in Baggage
TRC	Transit Cabin Load
TRH	Transit Hold Load
ULD	Unit Load Device
VAL	Valuables
WET	Goods in Wet Ice (Wet Cargo)
XCR	Operating Crew occupying passenger seat when no crew seat available; followed by number of seats by class. Figure group of each class to be separated by an oblique. XCR not included in the PAX FCM distribution, e.g. XCR/ 1 /2 or XCR/O/ 1
XPS	Express Parcel Service

3.2 Unscheduled Diversion or Non-revenue Flights Loadsheet Procedure

3.2.1 Introduction

This procedure will enable flight crews to produce and request a loadsheet at stations which has no access to DCS, or where no suitably qualified load control staff are available.

The aim of this procedure is to ease and expedite the production and receipt of the loadsheets required for departure during unscheduled diversion or non revenue flights.

With the need for compliance with OPS and introduction of subsequent quality systems within Ground Operations, there is a requirement for qualified load control staff to produce loadsheets, to support routine operations, unscheduled diversions, and non revenue flights. It must be noted that flight crew still have the authority to complete loadsheets if required. These procedures are to assist the prompt production of the necessary documentation in the event of:

- An unscheduled diversion when time may be of the essence.
- A major change or non-revenue flight where it is more practical to use load control expertise.

This procedure provides compliance with OPS and introduces a suitable audit trail and has been approved by the UK Civil Aviation Authority (CAA).

This procedure covers unscheduled diversion or non revenue flights, which can be categorised as follows:

1. Nil Change of Load.
2. Minor Change of Load.
3. Major Change of Load/New Loadsheets Required.

The following flow chart illustrates the decision process:

Unscheduled Diversion or Non-revenue Flights Loadsheets Procedure

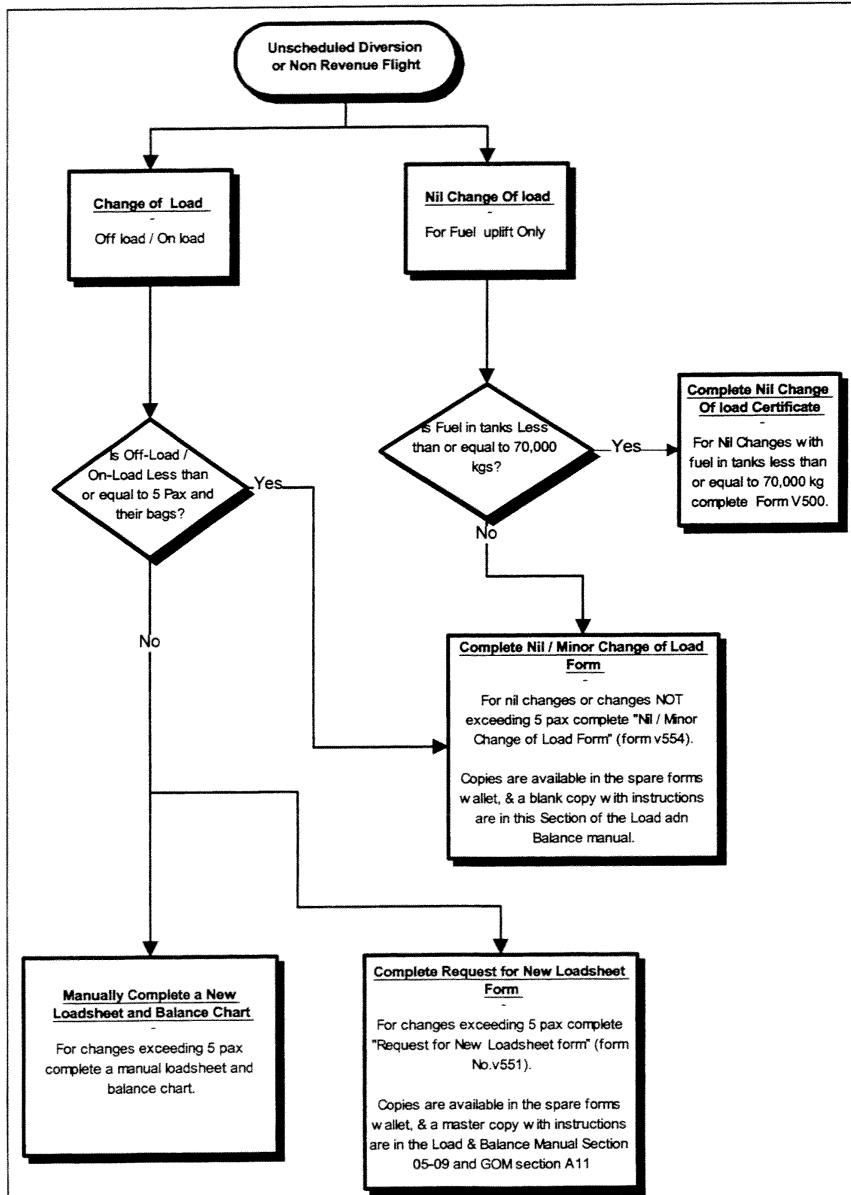


Figure 5-9-1. Decision Flow Chart Boeing 747-400 Aircraft Only



3.2.2 Nil/Minor Change of Load Certificate

3.2.2.1 Introduction

Whenever an aircraft diverts or makes a technical stop, provided the subsequent sector involves **no change** to the traffic load or crew compliment, or a **change not exceeding 5 passengers/crew and their baggage**, a 'Nil/Minor Change of Load Certificate' form v554 may be prepared in lieu of a new loadsheet.

This form certifies either:

- That the load has not been changed and enables revised balance data to be established following a change of fuel load. Should a crew change occur, provided the outgoing Captain can certify that the load is unchanged, a Nil/Minor Change of Load Certificate can be used. Where any doubts exist a complete loadsheet and balance chart must be completed or requested using the "Request for new loadsheet" form v551.
- That a 'minor change' of load has resulted from the diversion and enables revised balance data to be established following the minor change and a change of fuel load. The limit for a minor change is five passengers/crew and their baggage. The form cannot be used for any changes exceeding this limit. Where any doubts exist a complete loadsheet and balance chart must be completed.

The following rules apply to the minor change of load procedure:

- **Only passengers and their bags** can be considered under the "minor change" case. Any other alterations to the load must be considered as a major change.
- The combined weight of 1 passenger and 1 bag = 100 kg.
- The nil/minor change of load certificate must be prepared in duplicate. One copy must be left at the departing station.

3.2.2.2 Completion of the Form

An example of a completed "Nil change Scenario" is shown at the end of this section and an example of a completed "Minor change Scenario" is shown at the end of this section.

Instructions:

- A. Prepare in duplicate, leaving a copy at the departure station.
- B. Enter onward flight details.



- C. Enter previous flight details, obtained from loadsheet for previous flight.
- D. Enter Zero-Fuel Weight (ZFW) as per previous sector, obtained from loadsheet for previous flight.
- E. Enter weight change from previous sector. If no change enter 0. For the purposes of this form the combined passenger/crew and baggage weight is taken as 100 kg. Hence if 3 passengers are removed enter negative 300 kg in the "weight change from previous sector" box.
- F. Due to CWT/HST restrictions, there may be unusable fuel in the HST. This weight/index must be accounted for.
 - Input weight in HST Fuel.
 - Input Index in HST Fuel Index.
- G. Calculate the revised ZFW for the onward flight.
- H. Calculate Take-off and Landing Weights for onward flight.
- I. Enter the previous total on-board (TOB), the number of passengers off-loaded or on-loaded to the aircraft, and calculate the revised TOB.
- J. Enter the Laden Index at Zero Fuel Weight (LIZFW) as per previous sector, obtained from loadsheet for previous flight. Plot new ZFW on the balance portion of the form, obtain %MAC LIZFW and enter in the box provided.
- K. Enter Fuel Index, taken from the fuel table at the bottom of the form and calculate Laden Index at Take-off Weight (LITOW). Plot new TOW on the balance portion of the form, obtain %MAC LITOW and enter in the box provided.

The Balance section of the form has two forward limits and two aft limits. The furthest fwd and furthest aft limits are to be used for Nil Change only. For minor changes the inside limits apply.

- L. Captain to sign the form in the box provided.

Example of Nil Change Scenario

Nil / Minor Change of Load Certificate

Boeing 747-436
No Tail Tank Fuel

Originator	Recharge/date/time	Initials	Date	From	To
		M E S L D M	0 2 M A R 9 9	K W I	L H R
Flight:	A/c Reg:	Version	Crew		
S A 0 1 6	G-BNLF			4 1 5 1 5 1 5	

NIL or MINOR Traffic Load Change from Previous Sector. All load Details with the exception of Fuel and the changes below are as stated on the Loadsheets for

All Weights in Kilos

Flight:	Date	From	To
S A 0 1 6	0 2 M A R 9 9	S I N	L H R

ITEMS	ACTUAL WEIGHT	MAX WEIGHTS FOR	MAXIMUM ALLOWABLE WEIGHT
Zero Fuel Weight as per Previous Sector (a)	2 4 2 1 0 0		
Weight Change from Previous Sector* (b)		2 4 0 0 0 0	
REVISED ZERO FUEL WEIGHT (a) + or - (b)	2 4 2 1 0 0	ZERO FUEL	2 4 6 7 5 0
Take Off Fuel Tanks - Taxy	8 5 5 0 0 0	TAKE OFF	3 9 6 8 9 0
REVISED TAKE-OFF WEIGHT	3 2 7 6 0 0	TAKE OFF	3 9 6 8 9 0
Trip Fuel	8 1 5 0 0 0		
REVISED LANDING WEIGHT	2 4 6 1 0 0	LANDING	2 8 5 7 6 0

Previous	3	8	4
TOB			

No of Pax 74 0

Revised	3	8	4
TOB			

NOTE: INDEX SCALES
Index Scale 650 to 930 Applicable to
IVF, IVG, IVH, IVI ONLY

MINOR CHANGE NOT TO EXCEED 5 PASSENGERS

*NOTE: PASSENGER & BAGGAGE WEIGHT

For the purposes of this form only - the combined weight of 1 passenger or crew and 1 bag = 100 kg.

Previous 4 5 0
LIZFW 1 3
Fuel Index 4 6 3
LITOW

Fuel S.G. 0 8 1 0 kg/litre

When Fuel S.G. is less than 0.77 kg/litre DO NOT Trim A/C into AREA A, B, C.

% MAC at LIZFW 2 1 6 3
% MAC at LITOW 2 5 9

** NOTE MAXIMUM WEIGHTS
**IVF, IVG, IVH, IVI MTOW = 381,000 kg
**IVF, IVG, IVH, IVI MZFW = 251,740 kg

Preprint in duplicate. One copy to be left at Departing Station. Complete flight details and previous flight details.

MINOR CHANGE NOT TO EXCEED 5 PASSENGERS

This aircraft has been loaded in accordance with the deviations shown on the report. The container/pallets and bulk load have been secured in accordance with company regulations.

Signature: Captain: VXXXXXX

KG-WT INDEX	KG-WT INDEX	KG-WT INDEX	KG-WT INDEX
250000	-6	65000	-8
250000	-5	65000	-1
35000	-4	70000	+2
40000	-3	74520	+22
45000	-2	80000	+17
50000	0	85000	+13
54291	+3	90000	+9
60000	-3	95000	+5

Figure 5-9-1. Example of a Nil Change Scenario

Example of Minor Change Scenario

<p>Nil / Minor Change of Load Certificate</p> <p>Boeing 747-436 No Tail Tank Fuel</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="width: 15%;">Originator</td> <td style="width: 15%;">Recharge/date/time</td> <td style="width: 15%;">Initials</td> <td style="width: 15%;">Date</td> <td style="width: 15%;">From</td> <td style="width: 15%;">To</td> </tr> <tr> <td>BA 016</td> <td></td> <td>MB E LDM</td> <td>02 MAR 99</td> <td>KWI</td> <td>LHR</td> </tr> <tr> <td>Flight</td> <td>A/c Reg</td> <td>Version</td> <td>Crew</td> <td colspan="2"></td> </tr> <tr> <td>BA 016</td> <td>G-SMEL</td> <td></td> <td>4/15/99</td> <td colspan="2"></td> </tr> </table> <p>NIL or MINOR Traffic Load Change from Previous Sector. 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One copy to be left at Departing Station. Complete flight details and previous flight details.</p> <p>MINOR CHANGE NOT TO EXCEED 5 PASSENGERS</p> <p>This aircraft has been loaded in accordance with the deviations shown on the report. The container/pallets and bulk load have been secured in accordance with company regulations.</p> <p>Signature: _____ Captain: _____ XXXXXX</p>	Originator	Recharge/date/time	Initials	Date	From	To	BA 016		MB E LDM	02 MAR 99	KWI	LHR	Flight	A/c Reg	Version	Crew			BA 016	G-SMEL		4/15/99			Date	From	To	BA 016	02 MAR 99	SIN LHR	ITEM	ACTUAL WEIGHT	MAX WEIGHT FOR	MINIMUM ALLOWABLE WEIGHT	Zero Fuel Weight as per Previous Sector (a)	2 4 2 1 0 0			Weight Change from Previous Sector* (b)	2 4 0 0			REVISED ZERO FUEL WEIGHT (a) + or - (b)	2 4 1 7 0 0	ZERO FUEL	2 4 6 7 5 0	Take Off Fuel	Tanks - Taxy	8 5 5 0 0		REVISED TAKE-OFF WEIGHT		3 2 7 2 0 0	TAKE OFF	3 9 6 8 9 0	Trip Fuel		8 1 5 0 0			REVISED LANDING WEIGHT		2 4 5 7 0 0	LANDING	2 8 5 7 6 0	Previous	4 5 0	LIZFW		Fuel Index	7/ 1 3	LITOW	4 6 3	<p>NOTE: INDEX SCALES Index Scale 680 to 930 Applicable to IVF, IVG, IVH, IVI ONLY</p> <p>394620 kg MAX TAKE-OFF WEIGHT</p> <p>MTOW 381000 kg</p> <p>MZFW 251740**</p> <p>Balance Chart Shaded Area The inner area is for NG Changes The outer limits are for MINOR changes Only.</p> <p>TAKOFF FUEL WINDS & CENTRES</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th>KG-WT</th> <th>INDEX</th> <th>KG-WT</th> <th>INDEX</th> <th>KG-WT</th> <th>INDEX</th> <th>KG-WT</th> <th>INDEX</th> </tr> </thead> <tbody> <tr> <td>25000</td> <td>-6</td> <td>65000</td> <td>-8</td> <td>100000</td> <td>+1</td> <td>135000</td> <td>-57</td> </tr> <tr> <td>30000</td> <td>-5</td> <td>66514</td> <td>-10</td> <td>105000</td> <td>-5</td> <td>140000</td> <td>-68</td> </tr> <tr> <td>35000</td> <td>-4</td> <td>70000</td> <td>+2</td> <td>110000</td> <td>-6</td> <td>145000</td> <td>-78</td> </tr> <tr> <td>40000</td> <td>-3</td> <td>74514</td> <td>+2</td> <td>115000</td> <td>-7</td> <td>150000</td> <td>-86</td> </tr> <tr> <td>45000</td> <td>-2</td> <td>80000</td> <td>+7</td> <td>120000</td> <td>-26</td> <td>155000</td> <td>-96</td> </tr> <tr> <td>50000</td> <td>0</td> <td>85000</td> <td>+13</td> <td>125000</td> <td>-36</td> <td>160000</td> <td>-111</td> </tr> <tr> <td>54291</td> <td>+3</td> <td>90000</td> <td>+9</td> <td>126886</td> <td>-41</td> <td>165000</td> <td>-120</td> </tr> <tr> <td>60000</td> <td>-3</td> <td>95000</td> <td>+5</td> <td>130000</td> <td>-46</td> <td>166000</td> <td>-123</td> </tr> </tbody> </table>	KG-WT	INDEX	KG-WT	INDEX	KG-WT	INDEX	KG-WT	INDEX	25000	-6	65000	-8	100000	+1	135000	-57	30000	-5	66514	-10	105000	-5	140000	-68	35000	-4	70000	+2	110000	-6	145000	-78	40000	-3	74514	+2	115000	-7	150000	-86	45000	-2	80000	+7	120000	-26	155000	-96	50000	0	85000	+13	125000	-36	160000	-111	54291	+3	90000	+9	126886	-41	165000	-120	60000	-3	95000	+5	130000	-46	166000	-123
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Weight Change from Previous Sector* (b)	2 4 0 0																																																																																																																																																	
REVISED ZERO FUEL WEIGHT (a) + or - (b)	2 4 1 7 0 0	ZERO FUEL	2 4 6 7 5 0																																																																																																																																															
Take Off Fuel	Tanks - Taxy	8 5 5 0 0																																																																																																																																																
REVISED TAKE-OFF WEIGHT		3 2 7 2 0 0	TAKE OFF	3 9 6 8 9 0																																																																																																																																														
Trip Fuel		8 1 5 0 0																																																																																																																																																
REVISED LANDING WEIGHT		2 4 5 7 0 0	LANDING	2 8 5 7 6 0																																																																																																																																														
Previous	4 5 0																																																																																																																																																	
LIZFW																																																																																																																																																		
Fuel Index	7/ 1 3																																																																																																																																																	
LITOW	4 6 3																																																																																																																																																	
KG-WT	INDEX	KG-WT	INDEX	KG-WT	INDEX	KG-WT	INDEX																																																																																																																																											
25000	-6	65000	-8	100000	+1	135000	-57																																																																																																																																											
30000	-5	66514	-10	105000	-5	140000	-68																																																																																																																																											
35000	-4	70000	+2	110000	-6	145000	-78																																																																																																																																											
40000	-3	74514	+2	115000	-7	150000	-86																																																																																																																																											
45000	-2	80000	+7	120000	-26	155000	-96																																																																																																																																											
50000	0	85000	+13	125000	-36	160000	-111																																																																																																																																											
54291	+3	90000	+9	126886	-41	165000	-120																																																																																																																																											
60000	-3	95000	+5	130000	-46	166000	-123																																																																																																																																											

Figure 5-9-2. Example of a Minor Change Scenario



3.2.3 Nil Change of Load for Aircraft with Less Than 70,000 kg of Take-off Fuel

3.2.3.1 Introduction

Whenever an aircraft diverts or makes a technical stop, provided the subsequent sector involves no change to the traffic load or crew compliment, and the fuel in tanks will be less than or equal to 70,000 kg then a 'Nil Change of Load Certificate' form v500 may be prepared in lieu of a new loadsheet.

3.2.3.2 Completion of the Form

An example of a blank 'Nil Change of Load Certificate' form v500 is shown in [Section 3.2.4.2](#).

Instructions:

- A. Prepare in duplicate, leaving a copy at the departure station.
- B. Enter onward flight details.
- C. Enter previous flight details, obtained from loadsheet for previous flight.
- D. Enter Zero-Fuel Weight (ZFW) as per previous sector, obtained from loadsheet for previous flight.
- E. Calculate Take-Off and Landing Weights for onward flight.
- F. Enter previous flight % MAC Zero Fuel Weight and LIZFW.

% MAC Zero Fuel Weight (Previous Sector) = % MAC Take-off weight.

LIZFW (Previous Sector) = LITOW.

To convert LITOW to %MAC use QRH 03-11-17.

3.2.4 Major Change of Load/New Loadsheets

3.2.4.1 Introduction

If the unscheduled diversion causes a major change of load (greater than **5 passengers and their bags**) a new loadsheet is required. Where the airport has no access to DCS and there are no suitably qualified staff to produce a loadsheet, there are two methods available for determining the revised load and trim condition of the aircraft, as follows:

1. Manually complete a new Loadsheets and Balance Chart. Instructions on how to complete a Loadsheets and Balance Chart are included in the Load and Balance Manual Weights [Section 3](#).

2. Request a new loadsheet via *Form v551* entitled “Request for New Loadsheet from LHR/LGW”.

Form v551 is valid for all aircraft types and is found on the flight deck in the spare forms wallet.

3.2.4.2 Completion of the Form

Form v551 will be compiled either by flight crew or a station representative. All relevant sections must be completed, and the finalised form should be faxed to LHR or LGW, whichever was the originating or terminating Airport. The authorising signature on the form confirms that all aircraft load details are correct as stated. On receipt of a completed form LHR or LGW will produce a new Loading Instruction Report Form (LIRF) and loadsheet, and fax them back to the requesting airport. The 24 hour Qualified Load Control cover is shown on *Form v551*.

Note: The commander may choose to use *Form v551* to request a loadsheet for a non-revenue flight, such as an engineering positioning flight or engineering airtest. However, in the case of a non-revenue flight, where no ticketed passengers and or cargo are carried, such as an empty engineering positioning flight, there is no requirement for a formal loadsheet. In this circumstance the commander must satisfy himself as to the weight and balance of the aircraft.

This must include a check that the aircraft is in trim at both ZFW and TOW.

Note: Additionally:

- All stations are to retain documents for the six month statutory period.
- The DCS Help Desk is still able to provide loadsheet assistance, but is not able to produce or create a new/ revised loadsheet.
- The signature on the “Request for New Loadsheet Form” will either be the Captain or a Station representative.

An example of a completed “Request for New Loadsheet from LHR/LGW” (*Form v551*) is shown below.

Form v551

Valid All Aircraft Types

All Weights in kgs

BRITISH AIRWAYS

Request for New Loadsheet from LHR / LGW

Flight No.	EAS188E	(A)	Station	CBG	(B)	Destinations	LGW	(C)		
A/C Regn	G-VIIE	(D)	B.W.	139633	(E)	BJ.	180	(E)		
Crew Split	TECH/CABIN 2/0	(F)	Crew Bags Hold Stowed					(F)		
Catering	(N) As previous/ Change		Details: NIL LOAD						(G)	
5 th Engine Pod 747 - 400 (ONLY)	(Y)(N)		IF YES, ENGINETYPE (5 th POD):						(H)	
Fuel in tanks (excluding Ballast Fuel)	FUEL S.G. 0.8		(I)	KGS/LTR	(I)	38000	KGS			
Trip Fuel	(I)		5800						KGS	
Taxi Fuel	(K)		600						KGS	
Standard Distribution	(Y)(N)		(L)	IF NO - SPECIFY DETAILS:						
STAB. Tank Fuel (747-436 A/C only)	(Y)(N)		(M)	IF YES - SPECIFY WEIGHT:						
Ballast Fuel	(Y)(N)		(O)	IF YES - SPECIFY WEIGHT:						
RTOW	(Y)(N)		(P)	IF YES - SPECIFY WEIGHT:						
Performance penalties	(Y)(N)		(Q)	Details:						
Details of pax offload / onload (No. of pax & seat no.)										
/ NIL (R)										
Details of offload (Deadload)										
/ NIL (S)										
Details of onload (Deadload)										
/ NIL (T)										
Notes / Comments										
ALL HOLDS EMPTY (U)										
Information Compiled by: (Signature) (Print name & title):										
A.N. OTHER (V)										
TITLE: SUPERVISOR CBG BAY 1		STATION: CBG			FAX NUMBER: 01421 758393					

The signing of this form certifies that all aircraft load details are as stated.
 Fax completed form to LHR or LGW, whichever was the originating or terminating Airport.

Note: Fax and Tel numbers with SITA addresses for LCW, LHR are listed on the back of this form.

All stations to receive documents for statutory period

Form v551 (Issue 6th)

Instructions for Completion of Form v551

The following key provides a guide to assist in the completion of the form:

- A) Flight Number.
- B) Station IATA three letter code of requesting station.
- C) Full routing of flight from origin.
- D) Aircraft registration in full.
- E) Basic weight and index from "Weight & Centre of Gravity Schedule Extract" on aircraft flight deck.
- F) Crew split - Technical / Cabin.
- G) Catering - Circle choice of "Nil" or "As previous" or "Change". Note: Catering Code, Weight, Index and any additional details of offload / onload.
- H) 5th pod (747s only) - Note: Engine type / destination, if fitted.
- I) Record Fuel S.G. (kgs per ltr) and total fuel in tanks in kgs.
- J) Record Trip fuel in kgs.
- K) Record Taxi fuel in kgs.
- L) Is the fuel a standard distribution? If not, provide details of non-standard or unusable fuel.
- M) Horizontal stabiliser tank (747-436 only) - Record weight of fuel loaded in kgs.
- O) If applicable, record Ballast Fuel in kgs.
- P) Is there a Restricted Take Off Weight (RTOW)? Record weight in kgs.
- Q) Are there any additional performance penalties? Record any details.
- R) Passenger offload / onload ~
 - Offload - Record: names / seat numbers / number of bags.
 - Onload - Record: names / seat numbers / number of bags.
- S) Deadload offload - Record: weight / compartment / position / ULD type & details.
- T) Deadload onload - Record: weight / compartment / position / ULD type & details.
- U) Notes/Comments - Use this box to record reasons for offload / onload plus any relevant details to clarify loadsheet request.
- V) Compiled by - Signature, name and title of person completing (A-U), provide station & fax number.

**The signing of this form certifies that all aircraft load details are as stated.
Fax completed form to LHR or LGW, whichever was the originating or terminating Airport.**

Fax/Tel Numbers

LHR	Tel: 0208 564 0920 / 0909 Fax: 0208 738 9198 / 9196 SITA: LHRKBA LHRPLBA
LGW	Tel: 01293 666480 Fax: 01293 666847 SITA: LGWLCA

LHR / LGW -	Prepare loading instruction and fax to station
STATION -	Fax copy of signed loading instruction to: - LHR or LGW
LHR/LGW -	Prepare DCS L/S or Manual L/S & B/Chart & NOTOC & NC (Fax to station for signature)
STATION -	Fax signed L/S & NOTOC to: LHR or LGW

BRITISH AIRWAYS

Boeing 747-436

Nil/Minor Change of Load Certificate

Originator	Recharge date time	Initials	Date	From	To
<input checked="" type="radio"/>		LDM			
Flight	A/C Reg	Version	Crew	/ / / /	/ / / /

NIL OR MINOR Traffic Load Change from Previous Sector. All load details with the exception of Fuel and the changes below are as stated on the Loadsheets for
All Weights in Kilos

Flight	Date	From	To	ITEMS	ACTUAL WEIGHT	MAX WEIGHTS FOR	MAXIMUM ALLOWABLE WEIGHT	Previous TOB	No of Pax	Revised TOB	
Zero Fuel Weight as per Previous Sector (a)											
Weight Change from Previous Sector (b)											
HST Fuel (c)						ZERO FUEL					
REVISED ZFW (a) + or - (b) + (c)						TAKE OFF					
Take Off Fuel Tanks - Taxi						TRIP FUEL					
REVISED TAKE-OFF WEIGHT						REvised LANDING WEIGHT					
						LANDING					

NOTE: INDEX SCALES
Index Scale 680-920 Applicable to IVF, IVG, IVH, IVI ONLY.

MINOR CHANGE NOT TO EXCEED 5 PASSENGERS

NOTE: PASSENGER & BAGGAGE WEIGHT

For the purposes of this form only - the combined weight of 1 passenger or crew and 1 bag = 100 kg

Previous LIZFW			
Fuel Index	+/-		
HST Fuel Index	+		
LITOW			

FUEL S.G. 0 • kg/litre

WHEN FUEL S.G. IS LESS THAN 0.77 kg/litre DO NOT TRIM A/C INTO AREA A,B,C

%MAC at LIZFW

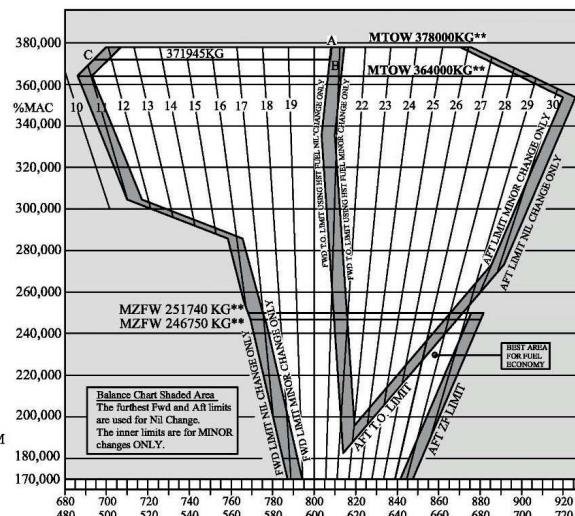
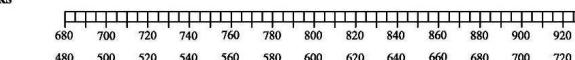
%MAC at LITOW

**** NOTE MAXIMUM WEIGHTS**
FOR THE CORRECT MTOW & MZFW
FOR YOUR A/C PLEASE CHECK THE LBM
NOTE - IVF, IVG, IVH, IVI HAVE NO HST

Prepare in duplicate. One copy to be left at departing station.
Complete flight details and previous flight details.

MINOR CHANGE NOT TO EXCEED 5 PASSENGERS
This aircraft has been loaded in accordance with the deviations shown on the report. The container/pallets and bulk load have been secured in accordance with company regulations.

Signature: Captain
V554(7th)



WT-KG INDEX	TAKE-OFF WINGS & CENTRE FUEL									
	WT-KG INDEX	WT-KG INDEX	WT-KG INDEX	WT-KG INDEX	WT-KG INDEX	WT-KG INDEX	WT-KG INDEX	WT-KG INDEX	WT-KG INDEX	WT-KG INDEX
1314 +19	-38									
3228 -40										
4000 +61	23000	-4	60000	-3	30000	-9	120000	-50	150000	-98
5000 +61	30000	-5	63000	-8	95000	-45	126886	-41	160000	-111
6000 +73	30000	-5	63000	-10	100000	+1	130000	-46	165000	-120
7000 +86	35000	-4	65514	-10	100000	-5	135000	-57	167000	-123
8000 +98	45000	-3	70000	-22	110000	-14	140000	-68	167000	-125
9000 +111	45000	-2	70529	-22	110000	-14	140000	-78	168000	-127
10000 +123	50000	0	80000	+17	115000	-15	145000	-88		
10300 +125	54291	+3	85000	+13	120000	-26	150000	-88		
10500 +126										

Form v500
**NIL CHANGE OF
LOAD CERTIFICATE**
BOEING 747-436

Priority	Address(es)					All Weights in Kilos	
Originator	Recharge/date/time	Initials	MS	MS	Date	From	To
Flight	A/c Reg	Version		Crew	MS		
NIL Traffic Load Change from Previous Sector. All Load Details with the exception of Fuel are as stated on the Loadsheets for							
Flight	Date	From	To				
ITEM	MATERIAL ALLOWABLE WEIGHT	ACTUAL	ACTUAL				
Zero Fuel Weight as per Previous Sector listed above							
Take-Off Fuel	- (taxi)						
Take-Off Weight							
Trip Fuel							
Landing Weight							
VALID ONLY FOR FUEL LOADS LESS THAN 70000KG : LIZFW = LTOW AND OR %MACZFW = %MACTOW							
LTOW TO %MAC: USE QRH 01-11-13							
<i>I Certify that the Weight Distribution and Security of the Load on this flight are unchanged from the Previous Flight identified above.</i> Signature _____ Captain				<input type="checkbox"/> LIZFW <input type="checkbox"/> LTOW <input type="checkbox"/> %MAC ZERO FUEL WEIGHT <input type="checkbox"/> %MAC TAKE OFF WEIGHT			

V500 (1st)



3.3 Fuel LMCs (Captains Only)

3.3.1 Fuel LMC

The Fuel LMC procedure is intended for use when there is a discrepancy between the Loadsheets Fuel as presented, and the fuel signed for in the Technical Log.

Only the captain may carry out the procedure. Fuel LMCs are permitted up to

+/- 1000 kg (B747-436) provided:

1. It is not practicable to obtain a new loadsheet prior to departure.
2. That no Operational, Structural, or Performance Limitations are likely to be exceeded following the use of this procedure. This check is particularly important if a possible increase in traffic load is combined with a positive fuel discrepancy. If any limitation is likely to be exceeded, a new loadsheet should be requested.

3.3.1.1 DCS or Manual Loadsheet

The loadsheet is annotated before departure against the ADJ lines with the ZFW; Correct fuel figure; new calculated Take-off Weight (TOW), and Landing Weight (LW) - See example on page 02. A copy will be left with the departure station.

3.3.1.2 Provisional Loadsheet

If a Provisional Loadsheet has been provided:

- a. Annotate the Fuel Discrepancy (+/- X kg) figure against the original figure on the **take-off fuel** line (see example on page 02).
- b. Upon receipt of the final figures, complete the ACT lines using the transmitted ZFW, adjust the original take-off fuel by the amount of the fuel discrepancy noted at (a) above.
- c. Calculate and record the new TOW and LW.
- d. A copy of this adjusted Provisional Loadsheet does not have to be left with the departure station, nor does Load Control have to be advised.

Note: The TOW transmitted to the aircraft will **not** have been adjusted for the fuel discrepancy.

Signature

The Captain should then sign for the adjustments (see examples). This signature indicates that the Captain has checked that no limitations have been infringed.

3.3.2 Examples

3.3.2.1 Manual Loadsheet

Zero fuel weight:	LMC	2 4 0 0 9	2 last minute changes	specification	cl /	+	weight	Balance and seating conditions
Max	+/-	=		Dest	M-F-CD-INF	B-C-M	cpt	-
2 4 6 7 5 0 +/-		=						DOI 416.8
Take-off fuel		1 1 0 0 0 0 0						LIZFW 455.4
+ 6 0 0		1 1 0 6 0 0						MACTOW 24.3%
Take-off weight	LMC	3 5 0 9 9 0						A12 B40 C74 D96 E96 F34
Max	+/-	= 3 5 1 5 9 2						Passengers/inf 352
3 9 6 8 9 0 +/-		=						Prepared by 
Trip fuel		9 7 0 0 0						KEVIN DOYLE QXD10
Landing weight	LMC	2 5 3 0 0 2						Approved by 
Max	+/-	= 2 5 4 5 9 2	LMC total +/-					
2 8 5 7 6 0 +/-		=						

3.3.2.2 DCS Provisional Loadsheet

TOTAL TRAFFIC LOAD	EST	42211					
DRY OPERATING WEIGHT		186520					
ZERO FUEL WEIGHT	EST	228731	MAX	246750	L	ACT	227.1
TAKE OFF FUEL		117200	+	600		+	117.8
TAKE OFF WEIGHT	EST	345931	MAX	394620		ACT	344.3 CAPTAIN
TRIP FUEL		101270					344.9 SIGNATURE
LANDING WEIGHT	EST	244661	MAX	285760			
BALANCE AND SEATING CONDITIONS			PAX ON BOARD		ACT	182+1	
BI 437.0	DOI 418.1						
LIZFW 420.7	LITOW 401.0						
MACZFW EST 22.7			MACZFW		ACT	22.7	
MACTOW EST 20.1			MACTOW		ACT	20.0	
SEATROW TRIM FOR SEATED PAX							
CLASS TRIM FOR TO-COME PAX							

3.4 Balance Chart Usage

3.4.1 General

3.4.1.1 The Balance Charts

Balance Charts provided for normal use are:



Aircraft Fitted Interior	Standard Balance
14F70J30W177M..74G.C 14F52J36W235M..74I.C 14F52J36W235M..74J.C 14F70J30W185M..74K.C 14F70J30W185M..74P.C 14F86J30W145M..74S.C	744A/1 (No Stab Tank Fuel) 744A/2 (Stab Tank Fuel)
14F70J30W185M..74K.C 14F70J30W185M..74P.C 14F86J30W145M..74S.C	44B/1 (No Stab Tank Fuel)

Two trim points, at ZFW and at TOW, need to be checked on the appropriate balance chart to ensure that the C.G. will remain safely within the Flight Manual Limits throughout the flight. Consequently, the charts are drawn assuming that the standard fuel loading is used in accordance with the procedure laid down in the Flight Manual.

3.4.1.2

Distribution of Passengers and Cargo

When using the Balance Charts in this Manual, the allocation of seats to passengers assumes an even distribution throughout the length of the Cabin Area(s) in use as represented by the Balance Chart Scales.

Cargo, baggage containers and pallets can be loaded in any position in each hold area (Compartments 1 to 4) provided the correct total loads in each compartment are entered in the appropriate Balance Chart trim scales. The weight of ULDs are not included in the Dry Operating Weight/ Basic Weight and are added by destination to the deadload weights entered on the loadsheet. Maximum Container and Pallet Loading Limits and Loading Instructions must be observed as detailed in *Section 2 – Loading Limitations and Cargo Restraint*.

Cargo and/or Baggage in the bulk compartment (Compartment 5) must be distributed evenly along the compartment length and must comply with the longitudinal compartment and floor loading limitations as detailed in *Subsection 2.2 – Maximum Loads*.

Allowance has been made in the Balance Charts for all reasonable passenger and crew movement. During Take-off and Landing, however, passengers must be in approved seats and crew must be on seats specified. The Captain may delegate authority to a crew member to prevent abnormal congregation when, in their opinion, trim may be adversely affected.



3.4.1.3 Balance Chart Passenger Number Assumptions

The Balance Chart assumes an average passenger plus hand baggage weight of 84 kg and passengers are accounted for on the trim scales by numbers.

Children included in the normal passenger distribution may be counted as adults for balance purposes. When large groups of children are carried, it is permissible to count these as adults for balance purposes provided they are reasonably uniformly distributed in Cabin Area OD.

It is assumed that children have been accounted for at 35 kg each on the Loadsheets. In all other cases, children should be taken as equal to half an adult passenger on the Balance Chart. When infants are carried, they are to be counted if occupying a seat, but can otherwise be ignored.

If seats carry deadload, convert the deadload to equivalent passengers – refer to [3.4.3.1](#).

3.4.1.4 Taxy Fuel Allowance

The Standard Taxy Fuel Allowance is 1300 kg, this may be altered at certain stations. The fuel shown on the loadsheet does not include the Taxy Fuel Allowance, so to determine the fuel at engine start-up, the Take-off Fuel is added to the Taxy Fuel Allowance. The Balance Chart is, however, completed using only the Take-off Fuel.

3.4.1.5 Loadsheets Produced by Computer

At stations where Loadsheets are produced by computer, the %MAC for trim purposes is determined from the same basic lever arm data used to produce the Balance Charts in this manual. Passenger loading however, is accounted for by considering seat rows rather than cabin areas, hence, achieving greater accuracy. Structural Limitations and safe forward and aft C.G. limits are held as parameters in the computer making it impossible for the programme to print out an unacceptable load situation.

3.4.1.6 Zero Fuel Centre of Gravity (C.G.) for Fuel Economy

Small but significant fuel savings can be produced by operating with an aft C.G.. Loadings should be planned, subject to observance of other Load and Balance considerations, to produce an aft LIZFW.

3.4.1.7 Stab Tank Fuel Allowance

There is no requirement to revise the fuel distribution for trim purposes when the final load in the stab tank is within ±300 kg of the trimmed figure.



3.4.2 Use of the Balance Charts

3.4.2.1 Compilation Instructions

(Standard And Fifth Engine Ferry Balance Charts)

1. Obtain the Basic Index from the Weight Schedule Extract, the Crew Index and the Pantry Index as detailed in Section 1.5 – *Aircraft Configuration, Weight and Index Data* and enter them in the relevant boxes provided.
2. Add (or Subtract) in the Miscellaneous box any other items not covered, e.g. Potable Water.
3. Sum (1) and (2) to find the Dry Operating Index and mark this value on the adjacent scale taking great care to observe the correct sign. Note that each division on this scale is equal to 5 Index Units.
4. Enter the loads in the compartments in the boxes provided. Enter the passenger numbers, not weights, (see *Section 3.4.1.3*) in the boxes provided for the relevant cabin areas.
5. Drop a vertical line from the Dry Operating Index Scale until it touches an oblique line on the first operative scale. Draw a horizontal line in the direction indicated for a distance corresponding to the amount of load (or passengers) relevant to that scale.

CAUTION: *For cabin areas OC and OD, each division represents 20 passengers, not 10, as it is for the other areas. Drop a vertical line to meet the next operative scale and repeat the process until reaching the index scale. The value obtained is the laden index at zero fuel weight (LIZFW) and should be entered in the box provided.*

6. Now use the LIZFW to enter the C.G. Grid and determine the intersection with the Zero Fuel Weight obtained from the Loadsheet. If this intersection lies outside either the Forward or Aft C.G. limits, i.e. is within the shaded areas, then cargo or passenger movement will be necessary.
7. If the load distribution is satisfactory, the Take-off Weight must be checked. Refer to Fuel Index tables. Entering the Fuel Wings and Centre Table at the appropriate fuel load, annotate the Index Value obtained in the Wings and Centre Fuel box provided taking care to observe the correct sign. Where Tail Tank fuel is used enter Tail Fuel table at the appropriate Tail Tank fuel load, annotate the

Index Value obtained in the Tail Fuel box provided taking care to observe the correct sign (for Weight values in between those quoted, use Interpolation).

8. Enter the S.G. of the fuel in the box provided.
9. Sum the values obtained from (5) and (7) in the boxes provided to find the value of the Laden Index at Take-off Weight (LITOW). Enter the C.G. grid with this value and determine the intersection with the Take-off Weight obtained from the Loadsheets. If this intersection lies outside the forward or aft C.G. Limits, i.e. is within the shaded areas, then adjustments to cargo or passenger distribution or possibly to fuel weight are necessary.

Note: Ensure to check the LITOW safe loading with the appropriate Forward limit e.g. Do not trim the a/c into the shaded area A, B, C, when no Tail Tank Fuel is loaded and fuel density is less than 0.77 kg/litre. Balance Charts 744/1 and 44A/1 are applicable.

10. When both the LIZFW and LITOW lie in the unshaded area of the grid, then the intersection of the TOW and the LITOW will give the %MAC for take-off.

3.4.2.2 Trim Check After Minor Load Change

For any minor change, trim can be checked without going through the scales again. Obtain the total index change from the reverse side of the Balance Chart and adjust the original LIZFW and LITOW points by moving them either to the left or right according to the sign and amount of the total index change. Use the new LITOW to obtain a revised figure for % MAC.

3.4.2.3 Worked Example

The example used is for the Standard Balance Chart (No Tail Tank Fuel) with a fuel S.G. greater than 0.77 kg/litre.

The Basic Weight and Index, Crew Weight and Index, and Pantry Weight and Index are obtained as laid out in, *Section 1.5 – Aircraft Configuration, Weight and Index Data*.

	kg	IU
Basic Weight and Index	175,913	432



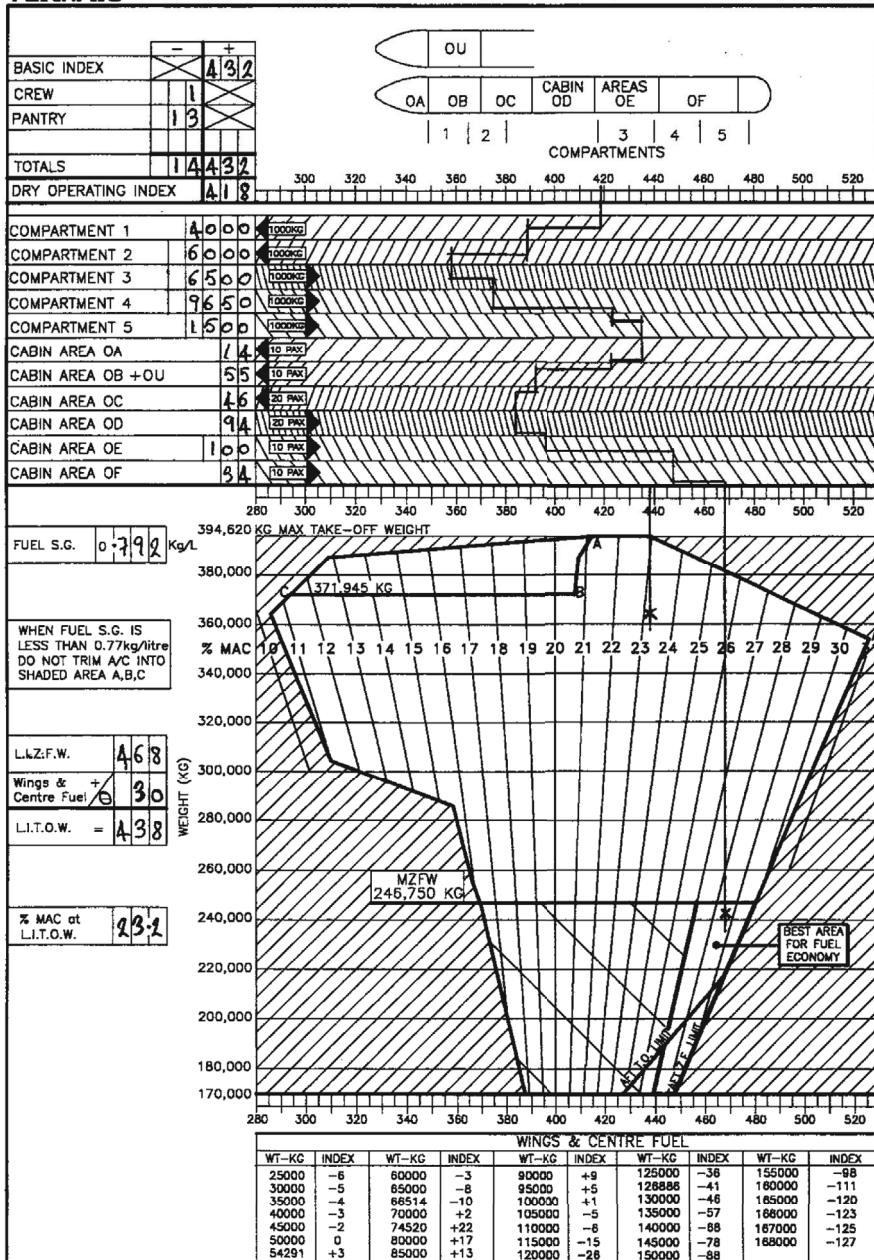
	kg	IU
Crew Weight and Index (2 Tech/15 cabin)	1615	-1
Pantry Weight and Index	7220	-13
Weight in Compartments (including ULDs where applicable)		
Compartments	1	4000
	2	6000
	3	6500
	4	9650
	5	1500

Passenger Numbers in Cabin Area for type code H44

OA	14	
OB + OU	55	
OC	46	
OD	94	
OE	100	
OF	34	
Total Traffic Load	55,678	
Zero Fuel Weight and Index	240,426	468
Wings and Centre Tank Fuel Weight and Index	122,000	-30
Tail Tank Fuel Weight and Index	0	0
Take-off Weight and Index	362,426	438

The ZFW/LIZFW and TOW/LITOW intersections both lie in the unshaded area, hence the loading is satisfactory. From the latter intersection the diagonal scales on the grid give the %MAC value for Take-off, which is 23% in this case.

Worked example Balance Chart supplied separately.

BRITISH
AIRWAYSB747-436 STANDARD
NO TAIL TANK FUEL BALANCE CHART No 744/1
ISSUE N

3.4.3 Additional Information

3.4.3.1 Equivalent Passengers (Deadload in Passenger Cabin)

If the total deadload in the cabin area is 30 kg or less, no Balance Chart Action is required.

If greater than 30 kg, then the deadload carried in the cabin area must be converted into 'equivalent' passengers by dividing the weight by 84 kg. If seats carry deadload, the total weight of the deadload is to be divided by 84 kg to give an equivalent number, e.g. 700 kg of deadload = $700/84 = 8.33$. Therefore work to an eight passenger equivalent.

Note: Round up or down as appropriate.

Inform the Cabin Crew of the number and position of the 'equivalent' passengers so that they are accounted for when checking that the Seating Conditions have been met.

Note: Any reference to passengers in Chapter 6 is to be interpreted as including equivalent passengers.

3.4.4 Special Cases

3.4.4.1 Towing

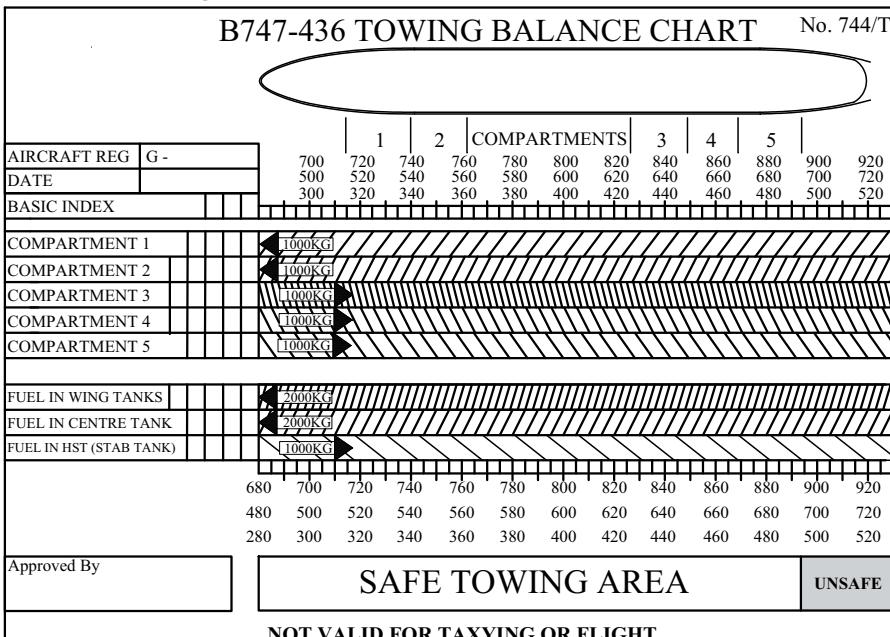
Towing

AIRCRAFT FITTED INTERIOR	TOWING BALANCE CHART
14F70J30W177M..74G.C	744/T
14F52J36W235M..74I.C	
14F52J36W235M..74J.C	
14F70J30W185M..74K.C	
14F70J30W185M..74P.C	
14F86J30W145M..74S.C	

Towing Balance Chart 744/T

B747-436 TOWING BALANCE CHART

No. 744/T



V497 (4th)

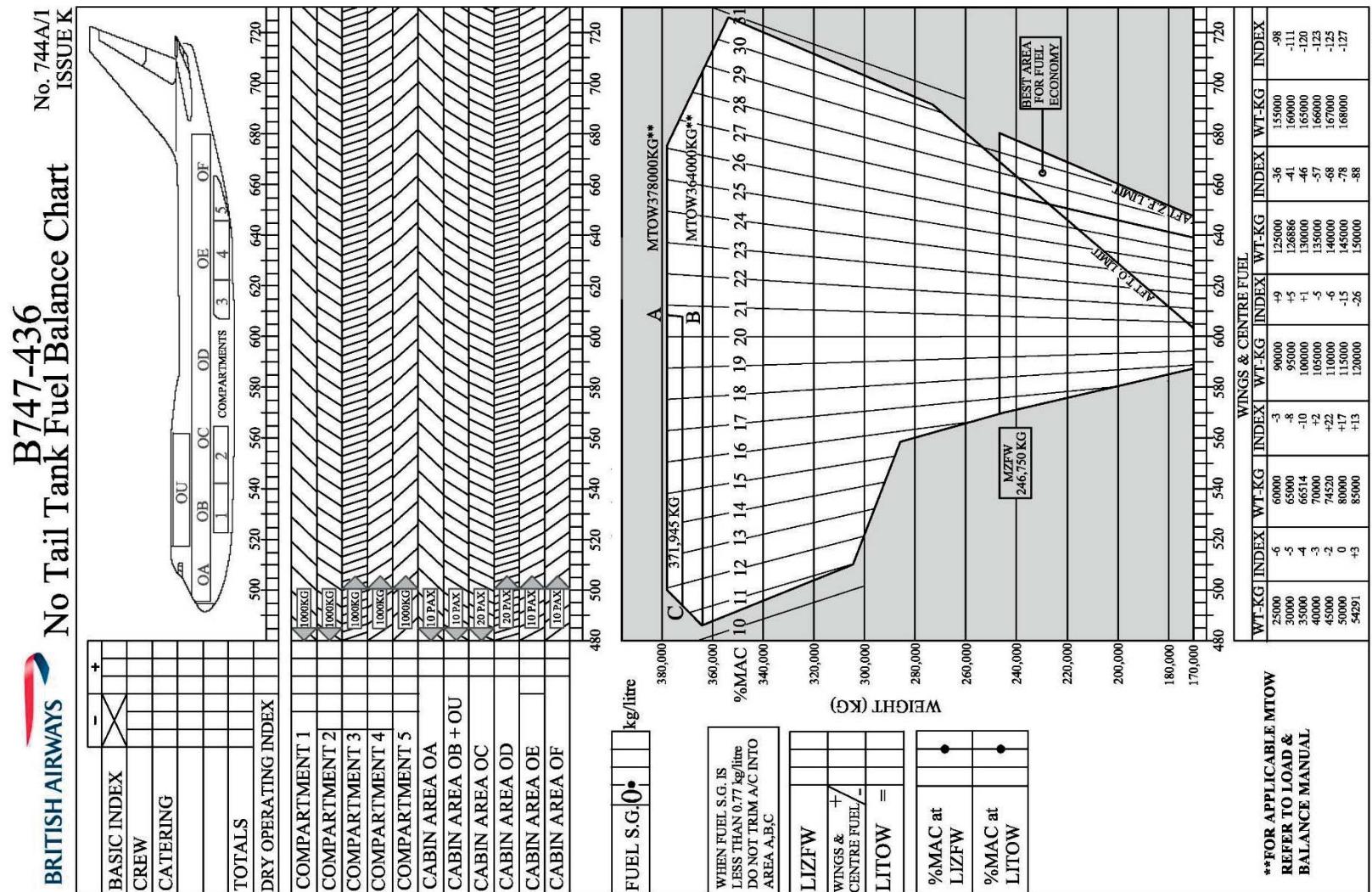
Compilation Instructions

1. Enter A/C registration and date.
2. Obtain A/C Basic Index from the Weight Schedule Extract. Mark this value on the adjacent Basic Index scale suitable for all aircraft type codes.
3. Enter the loads in each compartment in the boxes provided.
4. Enter the fuel onboard – Wings/Centre/HST.
5. Drop a vertical line from the Basic Index Scale until it touches an oblique line on the first operative scale. Draw a horizontal line in the direction indicated for a distance corresponding to the amount of load relevant to that scale. Drop a vertical line to meet the next operative scale and repeat the process until reaching the Index Scale.
6. Continue the vertical line through the Index Scale dropping into the Safe/Unsafe Towing Area. The A/C is safe to tow if the vertical line falls within the Safe Towing Area.

INTENTIONALLY BLANK

3.4.5 Balance Charts

3.4.5.1 No Tail Tank Fuel Balance Chart





B747-436
LOAD AND BALANCE MANUAL

ADDITIONS AND DEDUCTIONS INDEX TABLE

THIS TABLE GIVES THE INDEX CORRECTION REQUIRED FOR SPECIFIED INCREMENTS OF LOAD IN KGS ADDED OR DEDUCTED. THE SIGN CONVENTIONS FOR ITEMS ON ARE SHOWN TO THE LEFT AND ITEMS OFF ON THE RIGHT

LOCATIONS	KGS	50	70	85	100	200	400	600	800	1000	1500	2000	2500
FLIGHT DECK	NIL	1	1	1	1	2							NOT APPLICABLE
DOOR 1 AREA	NIL	1	1	1	1	2	3	5	7	9			NOT APPLICABLE
DOOR 2 AREA	NIL	1	1	1	1	2	3	4	5				NOT APPLICABLE
DOOR 3 AREA						NIL							NOT APPLICABLE
CPT No.1	NIL	1	1	1	1	1	3	4	6	7	11	15	18
CPT No.2			NIL		1	2	3	4	5	7	10	12	
CABIN AREA OA	NIL	1	1	1	1	2	4	6	8	10	15		NOT APPLICABLE
CABIN AREA OB	NIL	1	1	1	1	3	4	5	7	10	13	16	
CABIN AREA OC	NIL					NIL	1	1	2	2	3	4	5
CABIN AREA OD			NIL		1	1	2	4	5	6	9	12	15
CABIN AREA OE	NIL	1	1	1	1	2	3	5	7	8	13	17	
CABIN AREA OF	NIL	1	1	1	1	2	3	5	7	8	13	17	
CPT No.3			NIL		1	1	1	2	3	4	6	7	
CPT No.4			NIL		1	1	2	3	4	5	8	11	13
CPT No.5	NIL	1	1	1	1	1	3	4	6	7	11	14	18
DOOR 4 AREA	NIL					1	1	2	3	4			NOT APPLICABLE
DOOR 5 AREA	NIL	1	1	1	1	2							NOT APPLICABLE

ADDITIONS +

DEDUCTIONS -

B747 Load and Balance

AIRCRAFT VERSION CODE 74A

LAYOUT	14F + 70J + 30W + 17M	CABIN AREA	SEAT ROWS	1-5	14F
CABIN AREA	SEAT ROWS	MAX PAX	OA	OB	12-14
OA	1-5	14F			18J
OB	12-14				
OU	18J		OU		60-64
OC	60-64		OC		17-20
OD	12-14		OD		32J
OE	28-31 / 33-36				28-31 / 33-36
OF	30W / 40M		OE		30W / 40M
39-49	103M		OF		103M
50-53	34M				42M

AIRCRAFT VERSION CODE 74B

LAYOUT	14F + 70J + 30W + 17M	CABIN AREA	SEAT ROWS	1-5	14F
CABIN AREA	SEAT ROWS	MAX PAX	OA	OB	12-14
OA	1-5	14F			18J
OB	12-14				
OU	18J		OU		60-64
OC	60-64		OC		17-20
OD	12-14		OD		32J
OE	28-31 / 33-36		OE		28-31 / 33-36
OF	30W / 40M		OF		30W / 40M
39-49	103M				103M
50-53	34M				42M

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AIRCRAFT VERSION CODE 74C

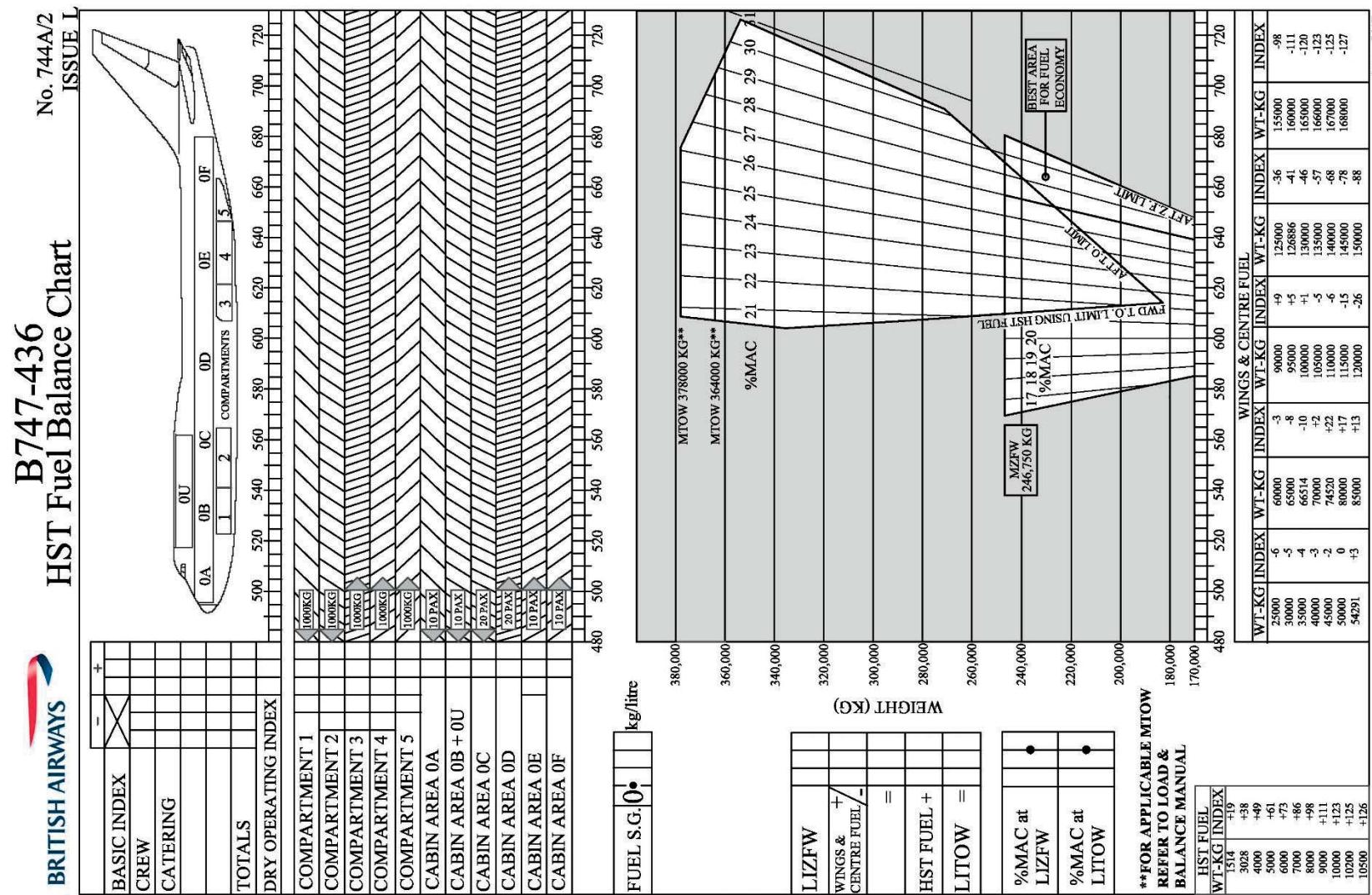
LAYOUT	14F + 70J + 30W + 185M	CABIN AREA	SEAT ROWS	1-5	14F
CABIN AREA	SEAT ROWS	MAX PAX	OA	OB	12-14
OA	1-5	14F			18J
OB	12-14				
OU	18J		OU		60-64
OC	60-64		OC		17-20
OD	12-14		OD		32J
OE	28-31 / 33-36		OE		28-31 / 33-36
OF	30W / 40M		OF		30W / 40M
39-49	103M				103M
50-53	34M				42M

AIRCRAFT VERSION CODE 74K

LAYOUT	14F + 70J + 36W + 235M	CABIN AREA	SEAT ROWS	1-5	14F
CABIN AREA	SEAT ROWS	MAX PAX	OA	OB	12-14
OA	1-5	14F			18J
OB	12-14				
OU	18J		OU		60-64
OC	60-64		OC		17-20
OD	12-14		OD		32J
OE	28-31 / 33-36		OE		28-31 / 33-36
OF	30W / 40M		OF		30W / 40M
39-49	103M				103M
50-53	34M				42M



3.4.5.2 HST Fuel Balance Chart





B747-436

LOAD AND BALANCE MANUAL =

ADDITIONS AND DEDUCTIONS INDEX TABLE

THIS TABLE GIVES THE INDEX CORRECTION REQUIRED FOR SPECIFIED INCREMENTS OF LOAD IN KG'S ADDED OR DEDUCTED. THE SIGN CONVENTIONS FOR ITEMS ON ARE SHOWN TO THE LEFT AND ITEMS OFF ON THE RIGHT

LOCATIONS	KGS	50	70	85	100	200	400	600	800	1000	1500	2000	2500
FLIGHT DECK	NIL	1	1	1	2						NOT APPLICABLE		
DOOR R AREA	NIL	1	1	1	2	3	5	7	9		NOT APPLICABLE		
DOOR L AREA	NIL	1	1	1	2	3	5	7	9		NOT APPLICABLE		
DOOR R & AREA											NOT APPLICABLE		
CPT No.1	NIL	1	1	1	1	3	4	6	7	11	15	18	
CPT No.2	NIL				1	2	3	4	5	7	10	12	
CABIN AREA OA	NIL	1	1	1	2	4	6	8	10	15		NOT APPLICABLE	
CABIN AREA OB/ CABIN AREA OC	NIL	1	1	1	3	4	5	7	10	13	16		
CABIN AREA OC	NIL				1	1	2	2	2	3	4	5	
CABIN AREA OD	NIL				1	1	1	1	2	3	4		
CABIN AREA OE	NIL	1	1	1	1	2	4	5	6	9	12	15	
CABIN AREA OF	NIL	1	1	1	2	3	5	7	8	13	17	21	
CPT No.3	NIL				1	1	2	2	3	4	6	7	
CPT No.4	NIL	1	1	1	1	2	3	4	5	8	11	13	
CPT No.5	NIL	1	1	1	1	3	4	6	3	7	11	14	18
DOOR R AREA	NIL	1	1	1	1	2	3	4	7	11	14	18	
DOOR L AREA	NIL	1	1	1	1	2					NOT APPLICABLE		

ADDITIONS

DEDUCTIONS +

B747 Load and Balance



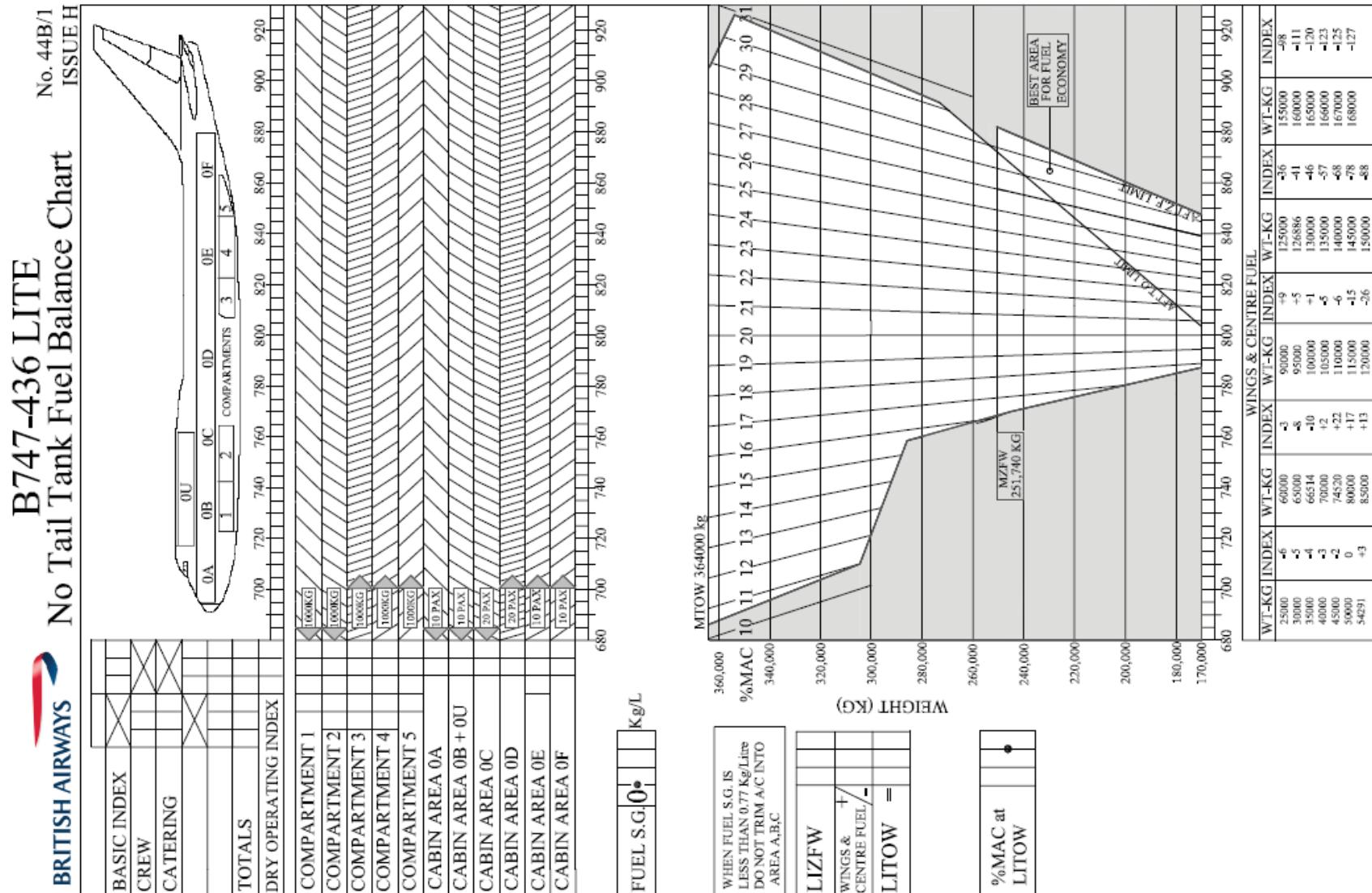
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3.4.5.3 No Tail Tank Fuel Balance Chart (LITE)





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LOAD AND BALANCE MANUAL

ADDITIONS AND DEDUCTIONS INDEX TABLE

THIS TABLE GIVES THE INDEX CORRECTION REQUIRED FOR SPECIFIED INCREMENTS OF LOAD IN KG'S ADDED OR DEDUCTED. THE SIGN CONVENTIONS FOR ITEMS ON ARE SHOWN TO THE LEFT AND ITEMS OFF ON THE RIGHT

LOCATIONS	KGS	50	70	85	100	200	400	600	800	1000	1500	2000	2500
FLIGHT DECK	NIL	1	1	1	1	2							NOT APPLICABLE
DOOR 1 AREA	NIL	1	1	1	1	2	3	5	7	9	11	15	18
DOOR 2 AREA		NIL		1	1	2	3	4	5	7	10	12	14
DOOR 3 AREA			NIL		1	2	3	4	6	7	10	12	14
CPT No.1	NIL	1	1	1	1	1	3	4	6	7	10	12	14
CPT No.2		NIL		1	1	1	2	3	4	5	7	10	12
CABIN AREA OA	NIL	1	1	1	1	2	4	6	8	10	15	17	21
CABIN AREA OB/	NIL	1	1	1	1	3	4	5	7	10	13	16	18
CABIN AREA OC		NIL		1	1	1	2	3	4	5	7	10	12
CABIN AREA OD			NIL		1	1	2	4	5	6	9	12	15
CABIN AREA OE				NIL	1	1	1	2	3	5	7	8	13
CABIN AREA OF					NIL	1	1	2	2	3	4	6	7
CPT No.3						NIL	1	1	2	3	4	8	11
CPT No.4							NIL	1	1	2	3	4	8
CPT No.5								NIL	1	1	2	3	4
DOOR 4 AREA									NIL	1	1	14	18
DOOR 5 AREA										NIL	1	1	1

ADDITIONS

+ DEDUCTIONS -



B747 Load and Balance

AIRCRAFT VERSION CODE 74K

LAYOUT	14F + 70J + 30W + 185M	MAX PAX	CABIN AREA	SEAT ROWS	14F + 86J + 30W + 145M	MAX PAX
CABIN AREA	SEAT ROWS					
OA	1-5	14F	OA	1-5	14F	
OB	12-14	18J	OB	12-14	18J	
OU	60-64	20J	OU	60-64	20J	
OC	17-20	32J	OC	17-20	32J	
OD	28-31/33-36	30W/40M	OD	21-22/33-36	16J/30W	
OE	39-49	103M	OE	39-49	103M	
OF	50-55	42M	OF	50-55	42M	

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Feb 2016

AIRCRAFT VERSION CODE 74C

LAYOUT	14F + 52J + 36W + 235M	MAX PAX	CABIN AREA	SEAT ROWS	14F + 86J + 30W + 145M	MAX PAX
CABIN AREA	SEAT ROWS					
OA	1-5	14F	OA	1-5	14F	
OB	11-16	36W	OB	11-16	36W	
OU	60-64	20J	OU	60-64	20J	
OC	17-20	32J	OC	17-20	32J	
OD	28-37	98M	OD	28-37	98M	
OE	39-49	103M	OE	39-49	103M	
OF	50-53	34M	OF	50-53	34M	

3.5 Altea FM Weight and Balance Documentation

British Airways currently manages weight and balance in a system known as Altea FM. This receives information regarding the load on the aircraft in order to calculate the weight and centre of gravity of the aircraft and generates the required documentation.

As a guide to these documents the following examples are shown detailing their composition in order to familiarise flight crew with the content. In essence, the examples presented are IATA standard documents with BA specific additions. The format generally remains the same irrespective of fleet however there are some minor notable differences due to the requirements of flight crew operating certain types of aircraft.

The examples shown may be derived from various aircraft types however where differences exist an example relevant to the fleet has been included. The examples are as follows:

1. FM Final Loadsheets.
2. FM Provisional Loadsheets.
3. Special Load Notification to Captain (NOTOC).
4. FM ACARS Final (Brief) Loadsheets.
5. FM Radio Final Loadsheets.

3.5.1 Altea FM Final Loadsheet

Example 1

1.EXAMPLE: FM FINAL LOADSHEET

① L O A D S H E E T CHECKED ^(a) APPROVED ^(b) EDNO ^(c) 01
 ALL WEIGHTS IN KILOGRAMS G WHITFIELD ^(a) APPROVED ^(b) EDNO ^(c) 01
 LICENCE XXX00

② FROM/TO FLIGHT A/C REG VERSION ^(a) CREW DATE ^(b) TIME
 LHR ATH BA632/17 GBNWM 24J24W141M.. 2/7 17FEB12 1232

③ LOAD IN COMPARTMENTS	WEIGHT	DISTRIBUTION ^(b)				
		1/	2/	3/	4/	5/
	8984 ^(a)	2198	3324	1592	0	
		1867	30	0	(c)	

④ PASSENGER/CABIN BAG 9988 ^(a) 76/ ^(b) 40/ ^(c) 4/ ^(d) 2 TTL ^(e) 122 CAB 0
 PAX 18/102 ^(e) SOC 2/ 0 ^(f)
 BLKD 0 ^(g)

⑤ TOTAL TRAFFIC LOAD 18972
 DRY OPERATING WEIGHT 93306
 ZERO FUEL WEIGHT ACTUAL 112278 MAX 126000 ADJ
 TAKE OFF FUEL 26072
 TAKE OFF WEIGHT ACTUAL 138350 MAX 181400 ADJ
 TRIP FUEL 14028
 LANDING WEIGHT ACTUAL 124322 MAX 136000 L ADJ

⑥ BALANCE AND SEATING CONDITIONS LAST MINUTE CHANGES
 BI ^(a) 588.0 DOI ^(b) 582.3 DEST SPEC CL/CPT - WEIGHT
 LIZFW ^(c) 579.3 ^(j) ^(k) ^(l) ^(m) ⁽ⁿ⁾
 LITOW ^(d) 579.3 ^(e) ^(f) .
 STAB: Flaps 5, 15, 20 4.3 UP.
 A16.B2.C48.D53.JMP1 ^(h)
 SEATROW TRIM ⁽ⁱ⁾ .

⑦ UNDERLOAD BEFORE LMC 11678. LMC TOTAL ^(o)
 LOADMESSAGE AND CAPTAINS INFORMATION BEFORE LMC

⑧ TAXI FUEL ^(a) 528 TAXI WGT ^(b) 138878 MAX ^(c) 181800

⑨ -ATH.76/40/4/2.0.T8984.1/2198.2/3324.3/1592.4/1867.5/3
 .PAX/18/102.PAD/0/1.EHO/34/0.EHO/33/0

⑩ SI BW 90937 BI 588.0

⑪ SERVICE WEIGHT ADJUSTMENT WEIGHT/INDEX
 ADD
 ATH HEADSETS 18 0.1
 ATH BLANKETS 4 0.0
 ATH JNX 45 0.3

⑫ Non Standard Pantry PANTRY EFFECT 1607 / 4 -

⑬ AUTHORISED WEIGHTS USED FOR PASSENGERS CREW AND BAGGAGE

⑭ SEVEN POINT CHECK COMPLETED TRM INITIAL

⑮ ATH FRE 4790 POS 1016 BAG 1609 TRA 0



The circled numbers and alpha characters in *Example 1* above cross-refer to the numbers in the explanation below.

1.
 - a. The Load Controllers Name and License number is generated by the system.
 - b. The Commander signs beneath the heading “APPROVED” to indicate their acceptance of the loadsheet.
 - c. EDNO is the edition number. Each time a new loadsheet is produced, this number will increase.
2. Departure/Destination airport, Flight number, Flight Date, Aircraft Registration, Version, Crew Configuration (Flight Deck/Cabin) and the Date and time of loadsheet production.
 - a. The Version may appear in different formats dependant on the aircraft type. It details the number of seats available either in total or by class breakdown.
 - b. If a flight is delayed until after midnight, the loadsheet production date will differ from the date after the flight number as the latter is the scheduled departure date.
3.
 - a. The total weight in Kilograms of deadload that has been loaded onboard the aircraft.
 - b. The distribution by compartment includes the weight of Unit Load Devices (ULD) for containerized aircraft.
 - c. Compartment 0 is the Main Deck cabin.
4.
 - a. The total weight of the passengers including cabin baggage.
 - b. The four figures after this (e.g. 76/40/4/2) are respectively, males, females, children and infants.
 - c. TTL is the total number of passengers on board including infants.
 - d. CAB is the weight of Cabin baggage not included in the passenger weight.
 - e. On the next line, the passengers are split into Class dependant on the flight, with the exception of infants.
 - f. SOC is the code for the number of seats occupied by deadload and the figures will show the number for each class.



- g. If any seats have been blocked for weight, without any located load in them, they will appear after the code BLKD, without being split by class.
5. The Total Traffic Load, a sum of the Load in Compartments (3a) and Passenger/Cabin baggage (4a), added to the Dry Operating Weight, becomes the Actual Zero Fuel Weight. Actual Take-off Weight and Actual Landing Weight follow below these as a logical addition and subtraction.

Alongside these are the three main Maximum or Regulated Structural Weights with the letter "L" indicating the Limiting Weight. The letters "ADJ" against the three Main Weights are provided for the adjustment of any Last Minute Changes (LMC) if present.

6. This area is laterally split into two parts "Balance and Seating Conditions" and "Last Minute Changes".

Balance and Seating Conditions.

The following items will appear on all loadsheets.

- a. BI. Basic Index.
- b. DOI. Dry Operating Index.
- c. LIZFW. Laden Index at Zero Fuel Weight.
- d. LITOW. Laden Index at Take-off Weight.

The following items may appear in the same general area but are generated dependant on the type of aircraft. e.g. The MACTOW is not generated for the B767 example given above as the STABTO at the given Flaps settings is sufficient.

- e. MACTOW. (Mean Aerodynamic Chord at Take-off Weight),
- f. MACZFW. (Mean Aerodynamic Chord at Zero Fuel Weight),
- g. STAB. Stabiliser Setting for Take-off for a particular flap setting. (As stated).

Beneath the Balance Conditions are the Seating Conditions. This includes:

- h. A split of passengers by cabin area. (for stations cutover to FLY/CM, this will include jumpseat passengers. From all other stations jumpseat passengers are shown as a service weight adjustment).
- i. A statement advising how the trim for the loadsheet was calculated (i.e. seatrow or cabin area trim).



Last Minute Changes.

- j. DEST. Destination.
 - k. SPEC. Specification of load (e.g. number of males, females, children, or infants, Mail, Cargo or Baggage etc.).
 - l. CL/CPT. Cabin area or Hold number.
 - m. | = plus (+) is written beneath this heading if the LMC is loaded on the aeroplane.
- = minus (-) is written beneath this heading if the LMC is offloaded from the aeroplane.
 - n. WEIGHT. Weight of the LMC in Kilograms.
 - o. LMC TOTAL. The total weight of all the LMCs, this is an arithmetic solution of all (+) and (-) LMCs.
7. Beneath the Balance and Seating Conditions is the Underload in Kilograms for the flight. The Underload figure is placed here to line up with the total in the Last Minute Changes area as a reference confirming how much load is available for use as LMC.

Note: Fuel is not allowable as an LMC by anyone other than the Captain.

(Refer to individual manuals for LMC maxima).

8. Taxi Weight Information.
- a. Taxi Fuel
 - b. Taxi (Ramp) Weight. This is the total weight of the aircraft at the gate prior to engine start.
 - c. The certified Maximum Taxi/Ramp Weight of the aircraft.
- Note:** If the aircraft is limited by Taxi Weight the limiting sign "L" normally associated with the MTOW, MZFW or MLDW in the main body of the Loadsheet (see para 5 above) will be placed next to the MTOW figure.
9. Information displayed here will appear on the Loadmessage and contains the following: Destination, numbers of Males, Females, Children, Infants, total deadload, compartment split by weight, and passenger split by class, excluding infants. Following this is a split of subload staff by class (PAD – passengers available for disembarkation) and particular types of special load containing the description, location and, in certain cases, the weight.



10. SI field. This is for plain language text generated by the Load Controller or system generated information useful to Flight Crew.
11. Service Weight adjustments (if required) detailing ADDITIONS and DEDUCTIONS. Any SWA will contain the Destination, a Brief Description, the Weight and Index effect.
12. Pantry. The weight and Index effect of any pantry used is shown here whether with a Standard or Non Standard Code.
13. This statement confirms the figures used for calculating the weight of passengers and baggage entered in the FM system are authorized.
14. In absence of the Load Controller who created the Loadsheets the TRM will cross-check the loadsheet and sign here to confirm the figures.
15. Statistical Load Display data (FRE = Cargo, POS = Mail, BAG = Baggage, TRA = Transit). The figures displayed here are net weight and do not include the ULD weights that carry the items. BAG Figures may be Actual or Standard dependant on the route.

3.5.2 Altea FM Provisional Loadsheet

Example 2

2: FM PROVISIONAL LOADSHEET – Generic Example

***** P R O V I S I O N A L ***** V E R S I O N *****

① L O A D S H E E T CHECKED APPROVED/TIME ② EDNO
ALL WEIGHTS IN KILOGRAMS G WHITFIELD 01
LICENCE XXX00

③ CAPTAINS NAME	FROM/TO FLIGHT	A/C REG	VERSION	CREW	DATE	TIME
	LHR ATH BA632/17	GBNWM	24J24W141M..	2/7	17FEB12	1137

LOAD IN COMPARTMENTS	WEIGHT	DISTRIBUTION				
	9083	1/	2198	2/	3324	3/
		4/	1966	5/	3 0/	0
PAX CABIN/BAG ④ EST	10510	82/	40/	4/	2	TTL 128
		PAX	18/108		SOC	2/ 0
	BLKD 0	④a				

⑤ TOTAL TRAFFIC LOAD EST	19593	ACT
DRY OPERATING WEIGHT	93306	ACT
ZERO FUEL WEIGHT EST	112899 MAX 126000	ACT
⑥ TAKE OFF FUEL EST	26072 ACT	ACT
TAKE OFF WEIGHT EST	138971 MAX 181400 ACT	ACT
TRIP FUEL	14028 ACT	ACT
LANDING WEIGHT EST	124943 MAX 136000 L ACT	ACT

BALANCE AND SEATING CONDITIONS	TOTAL ON BOARD ACT
BI 588.0 DOI 582.3	ACT
LIZFW 581.9	ACT

⑦ LITOW 581.9	ACT
STAB:Flaps 5, 15, 20 EST 4.1 UP.	STAB TO ACT
SEATROW TRIM FOR SEATED PAX	ACT

⑨ CLASS TRIM FOR TO-COME PAX	LIZFW ACT	ACT
	LITOW ACT	ACT

⑩ TAXI FUEL 528 TAXI WGT 139499 MAX 181800	ACT
--	-----------

SI BW 90937 BI 588.0	ACT
SERVICE WEIGHT ADJUSTMENT WEIGHT/INDEX	ACT
ADD	ACT
ATH HEADSETS	18 0.1
ATH BLANKETS	4 0.0
ATH JNX	45 0.3
Non Standard Pantry PANTRY EFFECT	1607 / 4 -

AUTHORISED WEIGHTS USED FOR PASSENGERS CREW AND BAGGAGE	ACT
SEVEN POINT CHECK COMPLETED	TRM INITIAL
ATH FRE 4790 POS 1016 BAG 1660 TRA 0	ACT



Station authorised by Senior Manager Systems to use the Late Closeout Procedure must board a “Provisional” loadsheet and retain a copy on the ground. These must be signed by the Captain.

The layout of the Provisional Loadsheets is essentially similar to the FM Final Loadsheets. The circled numbers in *Example 2* above cross-refer to the numbers in the explanation below and reflect only the differences between the FM Final and Provisional Loadsheets.

1. A dotted line with the words PROVISIONAL VERSION incorporated within it is placed at the top of the loadsheet to distinguish it from a Final loadsheet.
2. The “TIME” element is incorporated in the Provisional version when approving the Loadsheets. The “TIME” element is not printed on the Final Loadsheets.
3. The area for the Captains Name may be populated by the system at some point in the future but not during the early phases of FM deployment.
4. The “EST” (Estimated) placed next to the “PAX CABIN/BAG” indicates the total weight of passengers the system is estimating to board. Although there is no EST next to the “Load in Compartments” this figure includes the weight of hold loaded bags and is therefore also estimated and will change once the passenger figure is finalised.
 - a. The M/F/C/I breakdown is always based on the “Estimated To Board” figure until passenger acceptance is finalised when it then changes to the actual count by gender checked in for the flight. The figure below is the total passenger breakdown by Class which is always based on the “Estimated to Board” figure irrespective of whether the flight has been finalised or not. If the Provisional loadsheet is not produced until after passenger acceptance has been finalised a difference in process between the two sets of figures could lead to the anomaly of one total not equating to the other. Prior to passenger acceptance being finalised the two sets of figures on the Provisional loadsheet will match.

Note: The “Total by Class” figures reflect the number of classes sold on the flight and are not necessarily indicative of the “Version” of the aircraft as shown at the head of the loadsheet. It is possible for a “three class” long haul version aircraft to operate on a “2 class” short haul route.



5. Dotted lines separate the estimated operational figures from the breakdown and additional information.
6. The Total traffic load and as a consequence the ZFW, TOW and LDW are all estimated. A provisional loadsheet will not be issued in the FM system unless the Fuel figures have been finalised however it is possible to reopen the flight and update fuel figures therefore a cross check to the final loadsheet fuel figures is essential. The Dry Operating Weight is also subject to any changes in crew complement, catering, service weight adjustment or the addition of ballast/trapped fuel.
7. This area, normally associated with making adjustments, is provided with specific dotted lines preceded by "ACT" and is used to record the final weights as transmitted either by ACARs or verbally by radio.
8. The area of the loadsheet encompassing items 8 and 10 is populated by any Last Minute Changes (LMCs) on a final loadsheet. As the final figures included on a provisional loadsheet are passed "in lieu" of LMCs this area is devoted to recording updated mainstream figures such as, in this case, the total onboard.
9. This is to notify the method used to calculate the balance effect of the passengers on the aircraft. On a final loadsheet this will simply state whether the flight has been trimmed by Class, Cabin Area or by Seat Row. The provisional loadsheet is based on a mix of passengers already confirmed as seated and estimated to come. Those already checked in and issued with a seat onboard are trimmed according to the seat row they are seated in. Those not yet checked in are trimmed at the centroid for the class in which they are booked. Both figures are taken into account when stating the balance conditions at the time the provisional loadsheet is produced.
10. As with item (8) this area is used to record the final STABTO, LIZFW and LITOW as no LMCs are due on a provisional loadsheet.
11. The Estimated and Maximum Taxi (Ramp) Weight on the FM loadsheet will always be shown here however, if the flight is limited by Taxi/Ramp Weight the "L" limiting sign will be shown between the Max Take-off Weight and the area reserved for the "ACT" actual weight.

3.5.3 Altea FM Special Load Notification to Captain (NOTOC)

Example 3

**3. FM SPECIAL LOAD NOTIFICATION TO CAPTAIN (NOTOC) - Generic
containerised aircraft example**

SPECIAL LOAD NOTIFICATION TO CAPTAIN
 FROM FLIGHT (2) DATE (3) A/C REG
 LHR (1) BA067/10 10MAY12 GYMMMP (4)

*** DANGEROUS GOODS *** (18) (9) (12) (13) (14) (15) (16)
 TO AWB NR CL/DV UN/ID SUB PCS QTY/TI RRR PCK IMP CAO POS
 (5) (6) (7) COMP NR (8) RSK (10) (11) CAT GRP CODE ULD/CODE (17)

01. TOXIC LIQUID ORGANIC NOS (19) (15) (16)
 PHL 93132045 6.1 UN (8) 1 1L II RPB N 42P
 (5) (6) (7) 1993 (10) (11) (13) (14) PMC74619BA (17)

02. FLAMMABLE LIQUID
 PHL 93132045 3 UN 1 2.1L III RFL N 42P
 1993 (15) (16) PMC74619BA

03. HAZARDOUS LIQUID
 PHL 93132045 9 UN 1 3L RMD N 42P
 3082 (15) (16) PMC74619BA

04. ENVIRONMENTALLY HAZARDOUS
 PHL 93132045 9 UN 1 1L RMD N 42P
 3082 (15) (16) PMC74619BA

05. CARBON DIOXIDE
 PHL 92143494 9 UN 11 25K ICE N 31L
 1845 (15) (16) AKE33483BA

*** OTHER SPECIAL LOADS *** (20)
 TO AWB NR CONTENTS PCS QTY IMP POS
 CODE ULD/CODE

06. PHL PERISHABLE-UNPACKED 1 400KGS PEU 32L
 93309064 MEDICINE (15) (16) AKE70028BA

07. PHL PERISHABLE-UNPACKED 6 1830KGS PEU 21P
 93309064 MEDECINE (15) (16) PMC90826BA

08. PHL PERISHABLE-UNPACKED 6 1888KGS PEU 13P
 93309064 MEDECINE (15) (16) PAG56472BA

SI PREPARED BY Jacqueline/Thorp 07824 405724 (21)
 LICENCE LHRT4/64

THERE IS NO EVIDENCE THAT ANY DAMAGED OR LEAKING PACKAGES
 CONTAINING DANGEROUS GOODS HAVE BEEN LOADED ON THE AIRCRAFT.

LOADING SUPERVISOR (22)
 (NAME AND SIGNATURE)

CAPTAIN (23)
 (NAME AND SIGNATURE)

EMERGENCY TELEPHONE NUMBER 44 208 5640920 (24)



The Special Load Notification to Captain, more commonly known as the NOTOC, is issued to inform the Flight Crew of any Dangerous Goods or Special Loads placed on board the aircraft. The following explanation of the items on the NOTOC cross-refers to the circled numbers in *Example 3* above. Items 5 to 17 are column titles. These are duplicated in Row 1 of the Dangerous Good Advice Section in order to provide an example. The NOTOC itself is divided into three parts. The “flight and admin” section defined by items 1 to 4 and 21 to 24; The “Dangerous Goods” section as shown headed by Item 18 and; The “Other Special Load” section as headed by item 20. It is Mandatory for a NOTOC to be issued whenever dangerous goods are loaded on an aircraft. There are no differences in layout between a NOTOC issued for a containerised aircraft and one that is bulk loaded. The only difference on the NOTOC being the lack of ULD ID number. This difference is explained at item 17.

1. The originating Station.
2. The Flight Number and GMT date of departure out of the originating station.
3. The date of departure.
4. Aircraft Registration.
5. Station of Unloading. This is replicated for each item loaded as the NOTOC may be for a multi-leg flight.
6. The last eight digits of the Airwaybill number.
7. The Class, Division or Compatibility Group (Class1) of Goods as per the shippers declaration.
8. UN or ID number as per the shippers declaration.
9. Subsidiary Risk as per the Shippers Declaration.
10. Number of packages.
11. The net quantity per package. The figure to be followed by K, L or TI as applicable.
12. Radioactive Category.
13. Packing Group as per shipper declaration.
14. Cargo-IMP code.
15. Cargo Aircraft Only. If the item is banned from carriage on passenger aircraft then the letters CAO will appear on the line describing the goods in question. If the items are authorised then the letter “N” appears indicating no restriction.
16. The Position or Bay where the item is loaded.

17. The ULD Identification code number. In the case of items loaded in the Bulk compartment of a containerised aircraft or loaded onto a non-containerised aircraft this ID area simply states "BULK" to indicate the nature of loading.
 18. The heading for the "Dangerous Goods" section of the NOTOC.
 19. The individually numbered item of DG or SL.
- Note:** The numbering is consecutive across the DG and SL sections.
20. The Heading for the "Special Loads" section of the NOTOC.
 21. Supplementary Information section entered by the Load Controller also detailing their Name, Licence and contact telephone number. Where temperature setting requirements are included, they must be initialled as correctly set by the Captain for the Flight Deck ON/OFF setting AND the Loader for the Aft Hold and Bulk High/Low setting.
 22. Loading Supervisors signature block.
 23. Captains signature block.
 24. Emergency Telephone Number.

3.5.4 Altea FM ACARS Final Brief Loadsheet

Example 4

EXAMPLE: FM ACARS FINAL BRIEF LOADSHEET

Fig. 1

COMPLIANCE WITH EDNO 1	
BA632/17 17FEB12	
①	LHR ATH GBNWM 2/7
②	ZFW 112.3
	TOW 138.3
④	PAX 120 PLUS 2
	INC 1 JUMPSHIFT PAX
	STAB: 4.3 UP
	LIZFW 579.3
⑥	LITOW 579.3
⑦	FUEL IN TANKS 26600
⑧	1232Z 17FEB
	END
⑨	

Fig. 2

(a)	REVISIONS TO EDNO 1
	BA632/17 17FEB12
	LHR ATH GBNWM 2/7
	ZFW 112.3
	TOW 138.3
	PAX 120 PLUS 2
	INC 1 JUMPSHIFT PAX
	STAB: 3.4 UP //
	LIZFW 592.3 //
	LITOW 592.3 //
	FUEL IN TANKS 26600
	1242Z 17FEB
	END

Note: Check issue number matches Provisional Loadsheet.



ACARS loadsheets sent to aircraft within the British Airways operation will always be "Final" loadsheets and are sent to inform flight crew of the condition of the aircraft at closure. They are to be read in conjunction with the Provisional loadsheet, issued to provide flight crew with reasonably accurate figures and used to plan departure criteria. There are two types of ACARS Final Loadsheets, "BRIEF" and "EXTENDED". Although the Extended versions are available upon request only the "Brief" version will be sent for normal operations. The "Brief" version gives only the essential items required by flight crew as detailed in the following explanation of *Example 4* above.

Note 1: Passengers traveling on a crew seat will be shown as detailed in point 5.

Note 2: Any Diplomatic Mail that has not been advised to the Captain on the NOTOC, must now be shown as a SI message, e.g. "5 kg DIP MAIL IN CPT 5".

Note 3: The forward slashes (//) indicate changes that trigger the requirement for an ACARS "revisions" final loadsheet, e.g. Changes to ZFW, TOW fields. The RT/O now includes the wording COMPLIANCE WITH ISSUE 1 (or appropriate issue number) ACARS can only handle 21 digits, including blank spaces per line, so the word Compliance is truncated.

Note 4: The ACK from the aircraft will now send a copy of the RT/O message, to the local station printer (WAB 02). SITA Telex will control this via the TC table. This loadsheet must be placed on the local station flight file as it forms part of British Airways Audit Trail.

1. The first line indicates whether the ACARS loadsheet is in "Compliance with" the tolerances published in the FCOM as in Fig 1. The tolerances vary by fleet. If the final figures at flight closure do not exceed the ± figures published in the FCOM the ACARS final will be sent in "Compliance with" the latest edition number (EDNO); The EDNO will always refer to the latest edition number of the Provisional loadsheet issued to the flight crew. If the variance exceeds the published tolerances the loadsheet will be issued as "Revisions to" the latest edition number issued as shown in Fig 2 (a). A double oblique placed to the right of the item in question as in Fig 2 (b) highlights any revisions to the ACARS Final Brief loadsheet.
2. The Flight Number and Date on line 2 with the Origin, Destination, Registration and Crew Complement following on line 3.



3. Two dotted lines border the significant information, operational weight and balance conditions.
4. The ZFW and TOW are given in whole tonnes to the first decimal place, i.e. 100 kgs. The Take-off and Zero Fuel maxima, Take-off and Trip fuel figures, Landing weight with associated maxima and Underload are only available on the extended ACARS loadsheet.
5. Total passenger figures. A breakdown by Class is only available on the extended version. A M/F/C/I breakdown is not available. For stations that have cutover to FLY/CM, any jumpseat passengers on board are also shown, and are included as part of the total passenger figure above. For all other stations, a message must be included in the SI message e.g. "2 PAX ON J/S". This will print out beneath the LITOW line.
6. The STAB setting is given for the Flap setting shown on the provisional loadsheet (B767 Only). Any changes will be annotated by the double oblique and may also be noted in the free text Supplementary Information at the foot of the loadsheet.
7. The Laden Index at ZFW and TOW are given here. The Basic and Dry Operating Index are available on the extended version. On the extended version a passenger distribution by cabin section is also printed along with the method by which the passengers were trimmed onto the flight.
8. The Fuel in Tanks figure is generated automatically by the system on the ACARS brief loadsheet. It does not appear on the extended version. All text and figures given on the loadsheet between item 8 and 9 are S.I. (Supplementary Information) entries placed in the system by the Load Controller.
9. The time printed on the bottom reflects the time the loadsheet was transmitted. It also serves to act as a reference to which loadsheet is valid as the EDNO is not printed on the extended loadsheet.

3.5.5 Altea FM Radio Final Loadsheet**Example 5****5.EXAMPLE: FM RADIO FINAL LOADSHEET****Fig. 1**

BA632 17FEB LHR GBNWM 2/7 TIME 1346

BA632

COMPLIANCE WITH EDNO 1

ZERO FUEL WEIGHT 112 DECIMAL 3

TAKE OFF WEIGHT 138 DECIMAL 3

LANDING WEIGHT 123 DECIMAL 4

TOTAL PASSENGERS ON BOARD 120 PLUS 2

INCLUDES 1 JUMPSEAT PASSENGERS

STAB:Flaps 5, 15, 20 4 DECIMAL 3 UP

LADEN INDEX AT ZFW 579 DECIMAL 3

LADEN INDEX AT TOW 579 DECIMAL 3

SI FUEL IN TANKS 26600

EST ZFW 112473 ACT ZFW 112345

1 - CONFIRM REGISTRATION AND NUMBER OF

CREW WITH CAPTAIN

2 - READ THE TEXT BETWEEN THE DOTTED

LINES TO THE CAPTAIN ON THEIR REQUEST

3 - CONFIRM ACKNOWLEDGEMENT FROM THE
CAPTAIN AND COMPLETE THE FOLLOWING-----
STAFF NAME COMPANY NAME/STAFF NBR LOCAL TIME/DATE**Note:** Check issue number matches Provisional Loadsheets.

In the event of ACARS being unserviceable or unavailable a verbal transmission via R/T will be made. This type of Loadsheet differs only in so much as there is no physical record of it on the aircraft other than the corrections made to the Provisional Loadsheet as a result of the transmission of the "Radio Final" data.

- Staff reading the RT message must complete the line containing their Staff Name, Company/Staff Number, Local Time/Date.
- The RT must be kept on the local station flight file as it now forms part of the British Airways Audit Trail.

Note: For stations cutover to FLY/CM, this will include jumpseat passengers. From all other stations, the total passengers on board must be hand amended before verbal transmission whenever passengers are carried on crew seats. This is because they are not included in the pre-printed total figures.

Add, e.g., plus 2 pax on J/S.

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SECTION 1 UNIT LOADING AND SYSTEM OPERATION

1.1 General Description and ULD Configuration

1.1.1 General

Staff responsible for loading the 747 must be fully conversant with the regulations, procedures and safety requirements applicable to this aircraft. In particular, staff must have received training in the operation of the aircraft's mechanised container/pallet loading system and have passed a test to demonstrate their competency. Training will normally be carried out on the station.

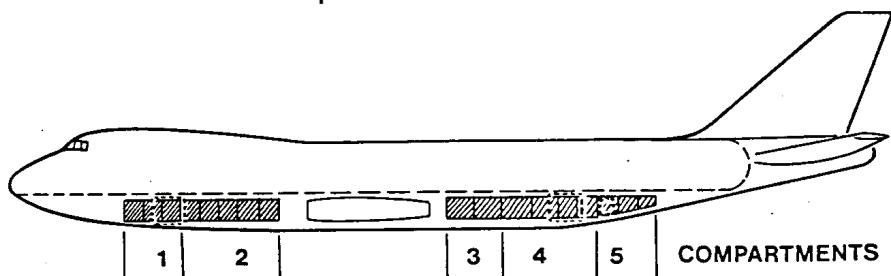
Under no circumstances may unqualified personnel be permitted to operate the aircraft loading system unless being supervised under training.

1.1.2 Description

1.1.2.1 Introduction

The 747 has five underfloor compartments for the carriage of deadload. Compartments 1 and 2 forward of the wing and Compartments 3 and 4 aft of the wing are mechanised for the carriage of Unit Load Devices. These compartments cannot be bulk loaded. The fifth compartment, Compartment 5, is situated to the rear of compartment 4 and is for the carriage of bulk load only.

Underfloor Compartments



1.1.3 ULD Configurations

1.1.3.1 Standard ULD Configurations (BA)

The standard configuration for Compartments 1, 2, 3 and 4 is:

Compartment 1	Six AK or AP series containers.
Compartment 2	Two AA series containers or PA pallets plus four AK or AP series containers.
Compartment 3	Two AA series containers or PA pallets.
Compartment 4	Two AA series containers or PA pallets plus four AK or AP series containers.

Note: In location 41P or 42P one M base size unit (125" x 96") may replace one A base size unit (125" x 88"). (Only one unit per flight).

This standard configuration is shown in the RCCA, but may be varied on a planned basis. However, stations must not change the configuration without prior permission of Capacity Optimisation Manager (LHRRRLBA) London, who will issue an amended RCCA.

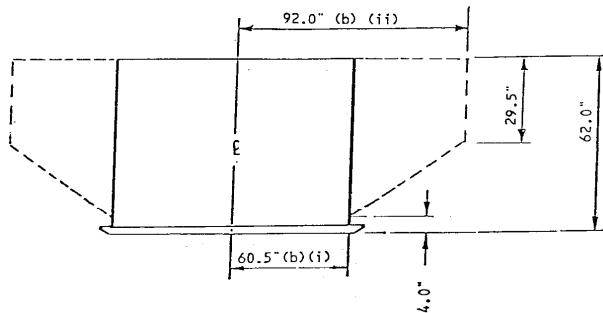
A full aircraft ULD complement must always be carried unless special instructions are issued by ULD Logistic Control – LHRRRLBA.

- Note:**
1. ULDs are to be loaded on the aircraft so that their doors or netted fronts are accessible from the hold door.
 2. Doors and netted fronts to containers/igloos and net attachment to pallets, must be fully secured.
 3. Two 60.4" x 61.5" base size containers may be replaced by one 60.4" x 125" base size lower deck igloo (AW, AL or DL series units).

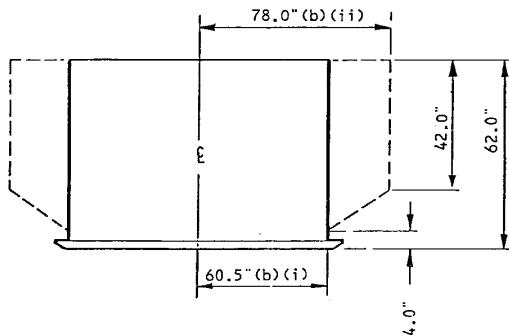
1.1.3.2 Max. Pallet Contour (See Note c)

The maximum contours that can be accommodated in compartments are shown below. The diagrams apply to pallets base size 125" x 88".

1. The following pallet contour is the maximum contour that can be accommodated on B747 aircraft.



2. The following pallet contour permits pallets to be transferred to/ from lower deck holds without contour change.



Note:

- a. Contour must be kept within dimension of 2.0" from 125" edge of pallet.
- b.
 - i. Pallets should be loaded in a manner such that the pallet contents do not overhang the pallet plan form dimensions.
 - ii. Exceptions to (i) are allowed provided the nature of the cargo is such that it can be sufficiently secured so as not to become a hazard or damage airplane structure during operational loads.

- c. Before transferring ULDs from one aircraft to another ensure that the pallet loading for the aircraft that the ULD is being transferred to does not exceed the floor loading requirements for that aircraft.

1.2 Hold/System Description

1.2.1 Introduction

The diagrams in this section illustrate the ULD handling equipment in Compartments 1 to 4 inclusive and the net/restraint details in Compartment 5, the bulk loaded compartment.

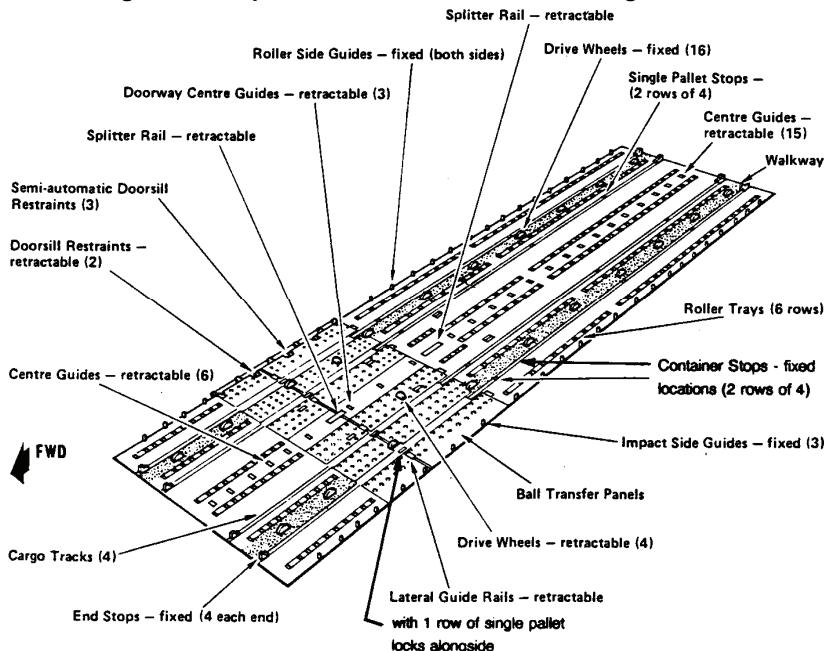
Compartment 1 to 4 are equipped with a power driven ULD handling and stowage system. For details of operation control panels see section 04-05 Compartment 1 and 2 and Compartments 3 and 4.

1.2.2 Compartments 1 and 2

1.2.2.1 General Arrangement

This hold is equipped to accept 125" x 60.4", 61.5" x 60.4" and 125" x 88" base size units. A 125" x 60.4" unit displaces two 61.5" x 60.4" containers.

Figure 1 Compartments 1 and 2 General Arrangement



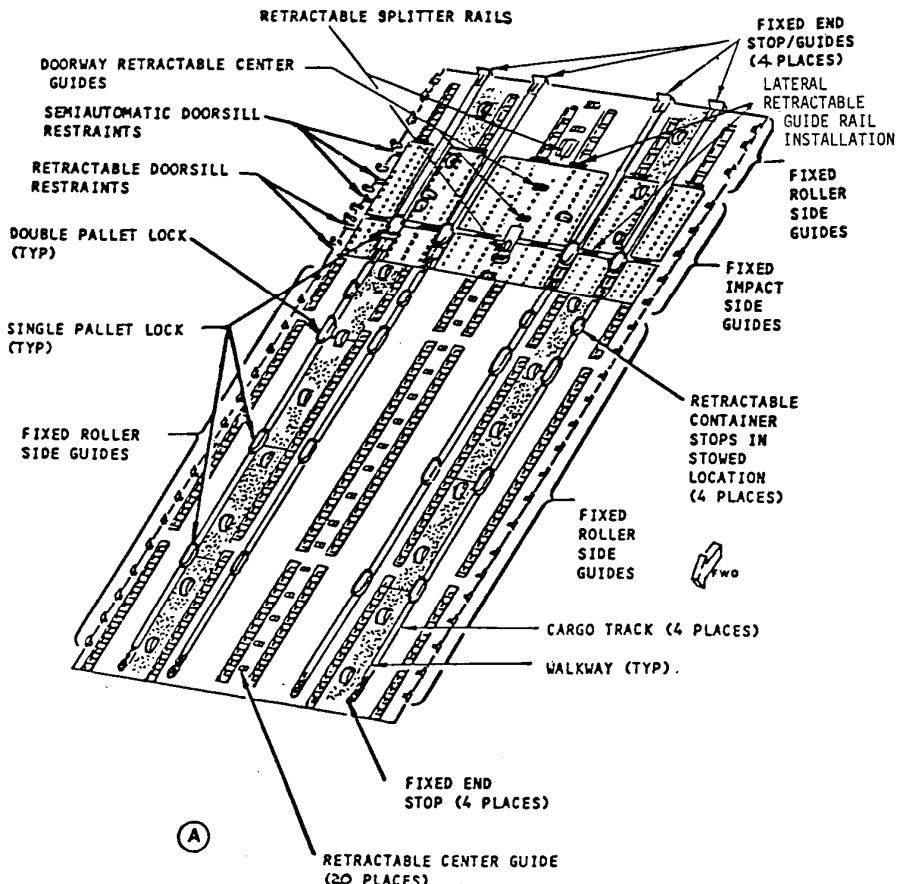
1.2.3 Compartments 3 and 4

1.2.3.1 General Arrangement

This hold is equipped to accept 125" x 60.4", 61.5" x 60.4" and 125" x 88" containers or pallet/net assemblies or combinations of these units (see section General Description and ULD Configuration). A 125" x 60.4" unit displaces two 61.5" x 60.4" containers athwartship.

At either one of the positions 41P or 42P a 125" x 96" unit may be positioned instead of a 125" x 88" unit.

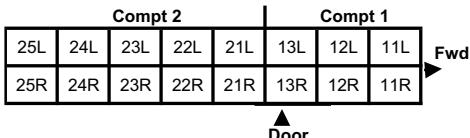
Figure 2 Compartments 3 and 4 General Arrangement



1.3 ULD Compartments and Configuration and Restraint

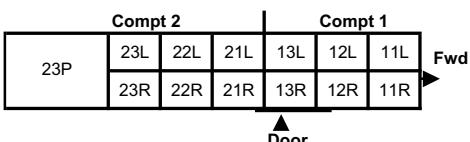
1.3.1 Compartments 1 and 2

Version 002



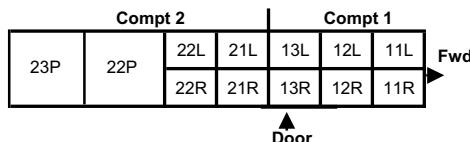
UP: Fore and aft lateral guides.
Retractable centre guides.
Retractable doorsill restraints.
Pallet locks between positions 12 and 13.

Version 100 **



UP: Retractable centre guides forward of 23P.
Forward and aft lateral guides.
Retractable doorsill restraints.
Pallet locks between positions 12 and 13 and forward of 23P.
Container stops forward of 21L and 21R.

Version 200



UP: Retractable centre guides forward of 23P.
Forward and aft lateral guides.
Retractable doorsill restraints.
Pallet locks between positions 12 and 13 and forward of 23P.
Container stops forward of 21L and 21R.

** Load limit notes:

Pallet Locks have less forward/aft load bearing capability than End Stops, Load Stops or Lateral Guides.



With these noted Pallet and Container intermix Versions 100:

Forward/aft loads transmitted directly through Pallet Locks, shall not exceed:

For each K- Base Container stack:	3175 kg. Acting on two Pallet Locks.
With L- Base Containers at each end of stack:	6350 kg. Acting on four Pallet Locks.

Note: These noted K and L- Base load limits through Pallet Locks, apply with or without (No-fit) Pallet positions occupied.

Note 1: Half width containers may be replaced with full width 60.4" x 125" base size containers, provided these are fitted in positions:

- i. 13 L/R, or
- ii. 12 L/R and successive positions forward, or
- iii. 21 L/R and successive positions aft, or
- iv. A combination of i, ii and iii.

Note 2: PLB/NLB ULDs are not permissible in forward hold (see *Subsection 2.2.4.1*).

Examples of Half Width Containers and 88" x 125" Pallet/Containers "No Fit" Positions

WARNING: All guide rails, stops, locks and restraints are to be raised to fully constrain all ULDs in the compartments, as well as in "no fit" position.

- a. "No Fit" Of 88" x 125" Pallets/Containers.
Either or both pallet positions may be "No Fit".
- b. "No Fit" Of Half Width Containers.
Combinations of the following "no fit" positions may be used to provide the total "no fit" requirement for each hold version:

**Version 002**

- i. 11L/12L
- ii. 11R/12R
- iii. 21L/22L/23L/24L/25L
- iv. 21R/22R/23R/24R/25R
- v. 13L/21L/22L/23L/24L/25L
- vi. 13R/21R/22R/23R/24R/25R

Note: It is not permitted “no fit” a single position in Version 002.

CAUTION: *If pallet locks at 12/13L or 12/13R are missing or inoperative, “no fits” in compartment 1 and 2 are to be restricted to nil or all positions in the line having the missing/inoperative locks.*

Version 100

- i. 11L/12L
- ii. 11R/12R
- iii. 13L
- iv. 13R
- v. 21L/22L/23L
- vi. 21R/22R/23R

CAUTION: *If pallet locks at 12/13L or 12/13R are missing or inoperative, “no fits” in compartment 1 are to be restricted to nil or all positions in the line having the missing/inoperative locks.*

Version 200

- i. 11L/12L
- ii. 11R/12R
- iii. 13L
- iv. 13R
- v. 21L/22L
- vi. 21R/22R

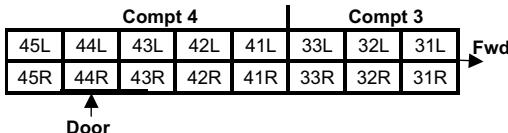
CAUTION: *If pallet locks at 12/13L or 12/13R are missing or inoperative, “no fits” in compartment 1 are to be restricted to nil or all positions in the line having the missing/inoperative locks.*

1.3.2 Compartments 3 and 4

- Configurations for the half width container and 88" and 125" pallet/container.

Note: Standard Configuration is Version 040.

Version: 001



UP: Fore and Aft Lateral guide rail.
Doorway retractable centre guides.

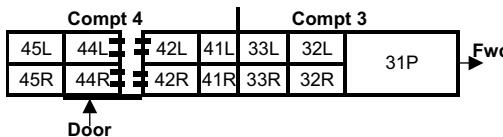
Retractable centre guides.

DOWN: Doorsill restraints.

Pallet locks.

Retractable container stops.

Version: 010 **



UP: Fore and Aft Lateral guide rail.

Pallet locks (31P).

Doorsill restraints.

Retractable container stops.

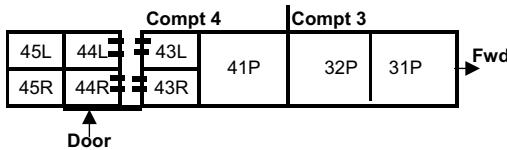
(32L/R-42L/R).

Doorway retractable centre guides.

Pallet locks (42P)

DOWN: Pallet Locks (32P-41P).
Retractable centre guides (31L/R).

Version 030



UP: Fore and Aft Lateral guide rail.

Doorway retractable centre guides

Retractable centre guides (43L/R-42L/R).

Pallet Locks (31P-41P)

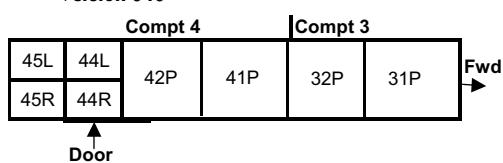
Retractable centre guides.

Doorsill restraints.

Pallet Locs (42P)

DOWN: Retractable centre guides(31L/R-41L/R).

Version 040



UP: Fore and Aft Lateral guide rail.

Doorway retractable centre guides

Pallet Locks.

Doorsill restraints.

DOWN: Retractable container stops.
Retractable centre guides (31L/R - 43L/R)

**** Load limit notes:**

Pallet Locks have less Fwd/Aft load bearing capability than End Stops, Load Stops or Lateral Guides.

With these noted Pallet and Container intermix Versions 020 and 010:

Fwd/Aft loads transmitted directly through Pallet Locks, shall not exceed:

For each K- Base Container stack: 3175 kg.
Acting on two
Pallet Locks.

With L- Base Containers at each end of stack: 6350 kg.
Acting on four
Pallet Locks.

Note 1: These noted K and L- Base load limits through Pallet Locks, apply with or without (No-fit) Pallet positions occupied.

Note 2: Half width containers may be replaced with 60.4" x 125" base size ULD in the above versions, provided these are fitted in positions commencing at 45L/R or 44L/R or 43L/R and successive positions forward, for versions 001 or 020; or 42L/R and successive positions forward for versions 010 and 030.

Examples of Half Width Container and 88" x 125" Pallet/Container 'No Fit' Position

WARNING: All guides, rails stops, locks and restraints are to be raised to fully constrain all ULDs in the compartments, as well as in 'no fit' positions.

a. 'No Fit' of 88" x 125" Pallets/Containers

The 'no fit' of 88" x 125" pallets is not usually applicable. Use configuration version for the actual number of 88" x 125" units and 'no fit' half width containers as required.

However, if it is necessary to "no fit" pallets in the rear hold to avoid a change of hold version then any pallet position may be "no fit" provided the following three conditions are met:

- i. Not more than two half width containers are in positions 32L through 43L and two half width containers in positions 32R through 43R.



- ii. The forwardmost half width container must be restrained in the forward direction by the pallet locks of the rearmost pallet position and the aft most container restrained in the aft direction by two pallet locks or container stops.
- iii. No gaps exist between the forward and aft container.

Half width container positions 45L/45R and 44L/44R are usable.

b. 'No Fit' of Half Width Containers

Note: Certified ULDs only, see *Subsection 2.2.4.1*.

Any positions left or right in location 44 and/or 45.

Any number of positions can be "no fit" commencing at 43L and/or 43R and successive positions forward providing the following three conditions are met.

- i. The forwardmost container is restrained in the forward direction by the compartment forward end stops or two pallet locks and the aft most container is restrained in the aft direction by two pallet locks or container stops.
- ii. No gaps exist between the forward and aft container.
- iii. Positions forward of the forwardmost container are filled by 88" x 125" pallets/containers or the forwardmost container is restrained by the compartment forward end stop.



SECTION 2 LOADING LIMITATIONS AND CARGO RESTRAINT

2.1 General

2.1.1 Lower Cargo Holds

- A. The illustration in Maximum Compartment Loads shows the location of the two cargo holds. The forward hold is sub-divided into Compartment 1 and Compartment 2. The aft hold is sub-divided into Compartment 3, Compartment 4 and Compartment 5.
- B. Compartments 1 and 2 combined can accommodate sixteen half width containers, or eight full width containers, or two (125 x 88) pallets/igloos and ten half width containers.

Alternatively, in compartments 1 and 2, a combination of pallets/igloos, full width or half width containers can be carried.

Compartments 3 and 4 combined can accommodate sixteen half width containers, or eight full width containers, or four (125 x 88) pallets/igloos and four half width containers. In either of the two rearmost pallet positions of Compartment 4 (41P and 42P), a 125" x 96" unit may replace a 125" x 88" unit.

Alternatively, in Compartments 3 and 4, a combination of pallets/igloos, full width or half width containers can be carried.

- C. Compartment 5 is for bulk loading only.
- D. Classification of Load:
 - Class 1 – An item weighing 250 kg or more.
 - Class 2 – An item weighing between 75 kg and 250 kg.
 - Class 3 – An Item weighing 75 kg or less.
- E. Care should be taken when loading all classes of cargo so that the accumulated load is inherently stable.
- F. Care must be exercised when standing items on each other on pallets and in igloos/containers. Heaviest items shall be placed on the base of the ULD but care needs to be exercised where a light packing case surrounds the item to avoid its collapse when another load is placed on top.
- G. In Compartment 5, Class 1 items shall not be stacked.
- H. Load should be placed on the floor of compartment 5, on pallets, or inside igloos/containers in such a manner to achieve a uniform load distribution as far as is practical.



- I. Loose bulk loads in containerised compartments must be placed in ULDs, or on pallets, and restrained by an approved net or by means of individual lashings. Loose bulk loads must not be placed on containerised hold floors or between sidewalls and ULDs. Bulk loads placed on pallets shall be adequately packaged so as to prevent damage to the articles, or injury to personnel, when restrained or when loading/unloading the pallet assembly.
- J. Cargo loaded on or in a ULD, or under an approved net installation, will not require additional tie-down unless the shape and density of the cargo could cause it to become a hazard or damage the aircraft structure as a result of shifting under operational loads, or individual piece weights exceed certain limitations defined in the section dealing with cargo restraint.
- K. If bulk cargo is carried and pallet nets cannot be used for restraint, it will be necessary to restrain the cargo using standard lashing straps/ropes – see the section dealing with cargo restraint. In this case, the normal procedure will be to leave the pallets in position, restraining them by means of the pallet restraint fittings. The cargo must then be separately restrained to tie-down fittings in the tracking or restraint hardware.
- L. When handling heavy pieces in aircraft holds, care must be taken to protect the aircraft structure against damage, particularly when using crowbars, pinchbars, or similar aids.

Although the use of these should be avoided, when there is no alternative they should be used on top of load spreaders or in conjunction with a piece of 5/8" thick plywood at least 24" square – NEVER directly on the aircraft floor.

- M. **CAUTION:** *A gap of at least 2" (50 mm) must be maintained between cargo payloads, and the ceiling areas of all cargo compartments, to ensure and enable the correct:*
 - *Fire detection and extinguishing systems operation.*
 - *Compartment decompression system operation.*
 - *Ventilation and cooling of the lighting installation.*

N. Before closing the cargo doors, the following actions are recommended:

In bulk cargo compartments:

Check and ensure all cargo nets are present, and fully secured/closed.

In containerised/IPL system cargo compartments:

Check and ensure all available restraint components (incl. locks, stops and lateral guides, etc.) are fully raised and securely locked.

These rules apply for any unoccupied ULD positions, **and** with holds empty.

2.1.2 Upper Deck and Main Deck Cabins

All deadload carried in the cabins, except normal cabin baggage, must be restrained to prevent movement in flight.

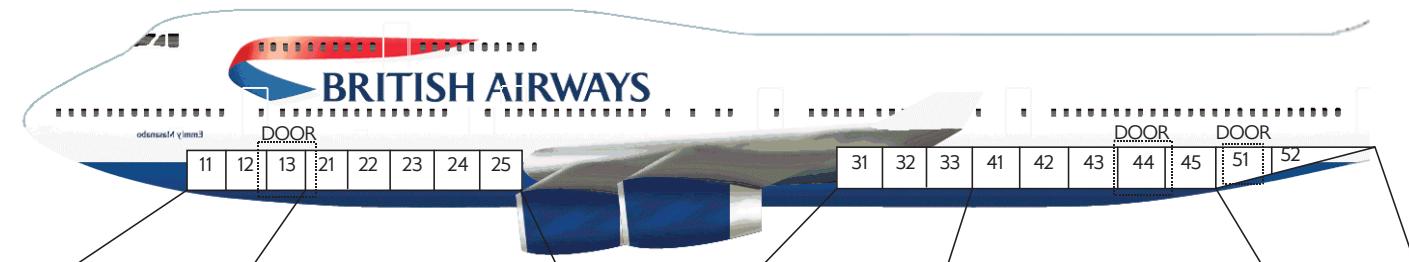
2.1.3 Unusual Cargo Problems

Unusual restraint and stowage problems of cargo, not included in this chapter, should be referred to Engineering Technical Services.

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2.2 Maximum Loads

2.2.1 Compartments



1 (B)			2					COMPARTMENT	3			4				5								
11	12	13 (B)	21	22	23	24	25	BAY/SECTION	31	32	33	41	42	43	44	45	51	52						
3175	2546	1740	3175	3175	3175	3175	3175	MAXIMUM LOAD KG																
						22P	23P (D)		31P (C)	32P	41P		42P											
						4626	4626		10974					15870										
			15875																					
			23336						COMBINED KG					19106										
								MAX FLOOR LOADING KG/M ² KG/FT ²																
976 90.7									976					732										
								MAX RUNNING LOADING KG/M KG/IN																
2070 52.6 (except D)									2070					1200 30.51										
								USEFUL VOLUME M ³ FT ³						52.6 (except C)										
63.36 2240									65.09					7.90 279										
									2300					5.89 208										

Notes: A. In addition to the compartment limitations shown, the cumulative load limitations for standard loading versions also apply. Refer to following pages.

B. Loads in Compt 1 can be increased by reducing the number of passengers in Zones A, B and Upper Deck.

C. The maximum load in position 31P may be increased to 5928kg providing the conditions shown on the following pages are satisfied.

D. The maximum load in position 23P may be increased to 6033kg providing the conditions shown on the following pages are satisfied.

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2.2.2 Max Cumulative Load – Compartments 3, 4 and 5

LOADING VERSION 001

← COMPT 3 → ← COMPT 4 → ← COMPT 5 →							
						51	52
31	32	33	41	42	43	44	45
						2165	
						5870	
						8060	
						10250	
						12480	
						14702	
						16895	
						19106	

LOADING VERSION 010

← COMPT 3 → ← COMPT 4 → ← COMPT 5 →							
						51	52
31		32	33	41	42	44	45
						2165	
						5870	
						9183	
						11400	
						13590	
						15820	
						19106	

LOADING VERSION 030

COMPT 3			COMPT 4			COMPT 5	
31	32	41				51	52
			42		44	45	
						2165	
					5870		
				9390			
			12600				
	15820						
19106							

LOADING VERSION 040

COMPT 3			COMPT 4			COMPT 5	
31	32	41	42		44	45	51
							52
						2165	
					5870		
				9390			
			12600				
	15820						
19106							

2.2.3 Conditions for Carriage of A-Base size 88 in × 125 in ULDs in Excess of 4626 kg

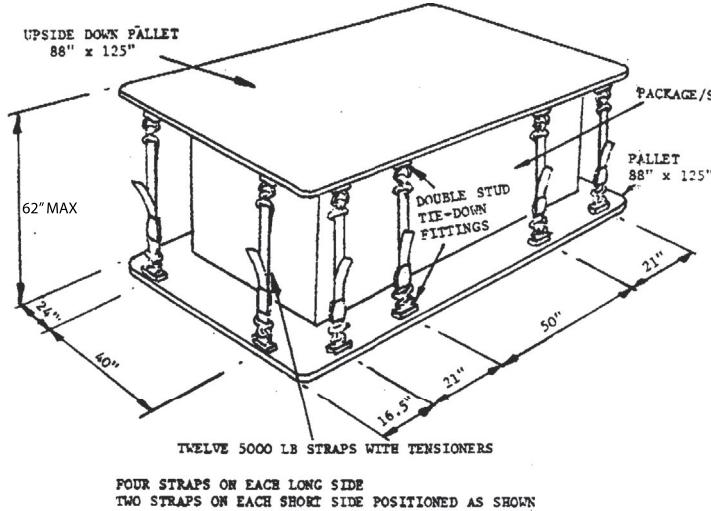
- A. Carriage is only allowed if the following conditions are satisfied.
- i. The unit is loaded in position 23P and/or 31P.
 - ii. All ULDs in excess of 4626 kg must be restrained with tiedowns. The tiedowns must be able to restrain the additional load in excess of 4626 kg (see [Section 2.4.2](#)). Loads in excess of 4626 kg are not permitted if any of the restraints in these positions are inoperative.
 - iii. The unit must be loaded with few or many identical items, stacked to a uniform height covering the entire base area.
 - iv. If the unit is a pallet (without wings) it must not be loaded to a height in excess of 40" and must be fitted with two fully serviceable nets (for heavy loads in excess of 40" high on pallets (without wings), see [B.](#), below).
 - v. Pallets with wings may be loaded to a height of 62" providing the load is uniformly distributed and stacked to a uniform height.

Note: 5000 kg is the maximum for these XAW units.

- vi. Containers must be volumetrically full (dunnage may be used), or the cargo restrained within the container in accordance with [2.4.2](#).
- vii. In addition to the above, Class I items or items which would constitute a hazard if unrestrained, must be individually secured as per [2.4.2](#).
- viii. All restraint fittings securing the overweight unit **and** those securing the adjacent unit must be fully serviceable.
- ix. Applicable units are IATA codes A-base Units (125 x 88) shown in [2.2.4](#) (Igloos UAK are not allowable).
- x. The **Minimum Zero Fuel Weight** must be in accordance with the following [2.2.3.1](#).

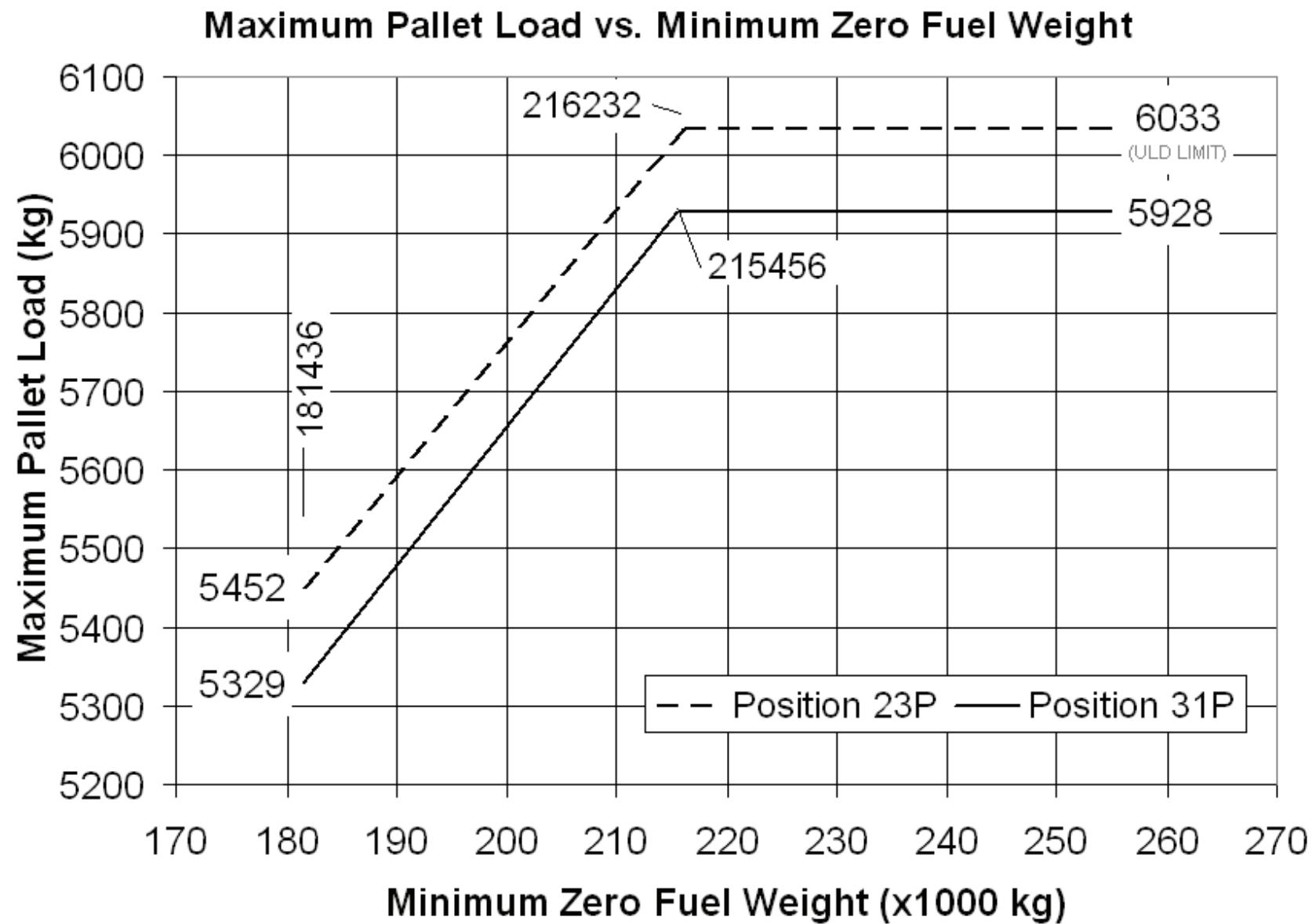
- B. Procedure for restraining heavy loads in excess of 40" high and 4626 kg weight on pallets without wings.

In addition to fitting an approved net as per *Section 2.4* and if necessary tie-down requirements per *Section 2.4*, further restraint must be provided by sandwiching between pallets as per the following instructions.



- i. The package/pallet assy as illustrated may be placed in position 31P or 23P but must not exceed the loads for those positions as defined in *2.2.2*.
- ii. If the load consists of various packages and a height difference exists between them, use timber packers above or below them as necessary to achieve a uniform height.
- iii. An assembly of various packages shall have its weight evenly distributed and shall be positioned to achieve a minimum distance from the four pallet edges.
- iv. When this is not possible, use timber spreaders above and below the package/s in accordance with *Section 2.5* ensuring that the effective widths/lengths of the spreaders extends to within 10" of the pallet edges.

2.2.3.1 Maximum Pallet Load vs Minimum Zero Fuel Weight



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2.2.4 Unit Load Devices (ULDs)

A unit load device (ULD) is a device for grouping and retaining cargo for transit. It may be a container or a pallet and net.

Certified (Approved) Units vs Uncertified (Unapproved) Units – Definitions/Identification.

To support compliance with CAA Mandatory AWN No 92.

Certified (Approved) ULDs

- Are manufactured, tested and proven to conform to accepted aircraft industry minimum performance standards. i.e. NAS3610 or AS1677 that suit specific Aircraft Cargo Compartment restraint systems.
- Such units satisfy the requirements of Technical Standard Order TSO-C90, and are identified accordingly.
- In addition, certified ULDs have manufacturer's instructions for lifetime care, repair and maintenance.
- Certified Containers have IATA ULD Ident Code Markings, prefixed A, e.g. AKE, AAP.
- Certified Pallets have IATA ULD Ident Code Markings, prefixed P, e.g. PAG, PMC.

Uncertified ULDs

- Do not have to meet the criteria noted above for Certified ULDs.
- Their use on BA aircraft shall be strictly limited and controlled.
- See the applicable Load and Balance Manual section/table for ULD Type identification, and further guidance on restrictions for Uncertified ULDs.
- Uncertified Containers have IATA ULD Ident Code Markings, prefixed D, e.g. DPN, DQF.
- Uncertified Pallets have IATA Ident Code Markings, prefixed F, e.g. FLA.
- The lateral positions, external dimensions, volumes and certified weights of ULDs, for use in the forward and aft main compartments are as follows:



Note: ULDs not specified in this manual, with weights exceeding these limits, or with cargo of such shape or density as to pose a hazard to the aircraft structure, must be restrained by cargo tiedown as defined in section *Subsection 2.4 - Cargo Restraint*.

ULD Designation

Containers

Size Code	Common ID	IATA ID	Base Dimns (W x L) in	
K	LD-1 LD-3	AKC AKE	61.5	60.4
L	LD-11 LD-6	ALP ALF	125	60.4
P	LD-2	APE	47	60.4
A	LD-9	AAP AAK	125	88

Pallets

Size Code	Common ID	IATA ID	Base Dimns (W x L) in	
A	P1	PAG	125	88
L	(Half Pallet)	PLA	125	60.4
M	P6	PMA PMC	125	96
N		(Half-Width)	61.5	96

Equivalent Codes

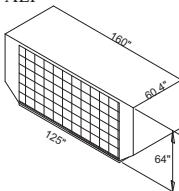
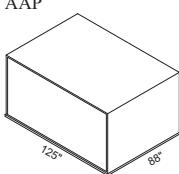
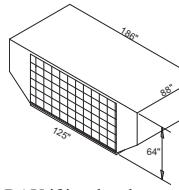
The naming convention used to identify ULD type and dimensions changed after September 1990. The table below indicates the ULD codes used pre-1990 and the equivalent ULD codes used post 1990. The dimensions of equivalent pre-1990 and post-1990 ULD codes are identical.

ULD Code		
Pre-1990	Post-1990	
AVE	AKE	
AVC	AKC	
AWD AW2 AWB	...refers to...	ALP
AA2	AAP	
AA4	AAK	
PAD/NAD P1P/N1D	PAG/NAD	

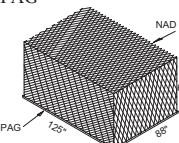
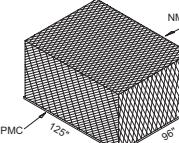
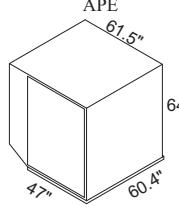
2.2.4.1 Certified ULDs

Please note that the following tables show only the post-1990 ULD codes.

Type of Unit and External Dimensions	Tare Weight (kg)	Usable Volume (ft ³)	Max Gross Weight (kg)	Limitations
AKE 	72 (Weight of latest type units – when planning load, allow for a mix with older units and 94 kg)	150	1588	None
AKC 	80	165	1588	None
ALP 	185	240	3175	None
PLA / NLA 	73 (with allowable overhang)	280	3175	Rear Hold Only
ALU 	202	330	3175	None

Type of Unit and External Dimensions	Tare Weight (kg)	Usable Volume (ft ³)	Max Gross Weight (kg)	Limitations
ALF 	172	310	3175	None
AAP 	200	350	4626	6033 Max Gross Weight if conditions in Section 2.2.3 are met
AAU  RAU if insulated	308	485	4626	6033 Max Gross Weight if conditions in Section 2.2.3 are met



Type of Unit and External Dimensions	Tare Weight (kg)	Usable Volume (ft ³)	Max Gross Weight (kg)	Limitations
PAG 	120	420	4626	6033 Max Gross Weight if conditions in section 2.2.3 and later in this section are met.
PMC 	130	460	5034	Limited by Position See later in this section
APE 	70	120	1225	May only be fitted in position: FWD – 12 L/R – 13 L/R AFT – 43 L/R – 44 L/R Vertical side must be against outboard side rail. An AK unit or another APE must be alongside.

2.2.4.2 Certified Thermal (Climate Controlled) Containers

Two basic types:

- Containers using Dry Ice as coolant.
- Containers featuring an electronic refrigerant and heating system (Active Container). Data pending.

Type	Tare Weight (kg)	Usable Volume (ft ³)	Max Gross Weight (kg)	Limitations
RKN (A)	300 Plus up to 175 kg of Dry Ice	102	As per AKE	<ul style="list-style-type: none"> Units must be prepared IAW the approved unit Operations Manual prior to load. Preferred carriage in aft hold with heat selection at high and unit located outside of doorway/threshold area. Dry Ice is classed as dangerous goods – see Dry Ice rules and limitations.
RAP (A)	550 Plus up to 210 kg of Dry Ice	290	As per AAP	
RAP (B)	1060	225	As per AAP	<ul style="list-style-type: none"> Units must be prepared IAW the approved unit Operations Manual prior to load. This includes correct: <ol style="list-style-type: none"> Container Charging. Container Preconditioning. Container Loading. Preferred carriage in Aft hold with heat selection at high and unit located outside of doorway/threshold area.

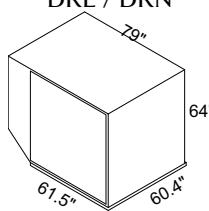
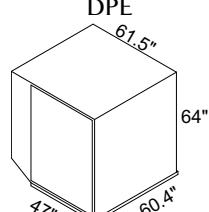


2.2.4.3 Uncertified ULDs

Carriage of specific Uncertified Containers on 747 aircraft are permitted with the following limitations:

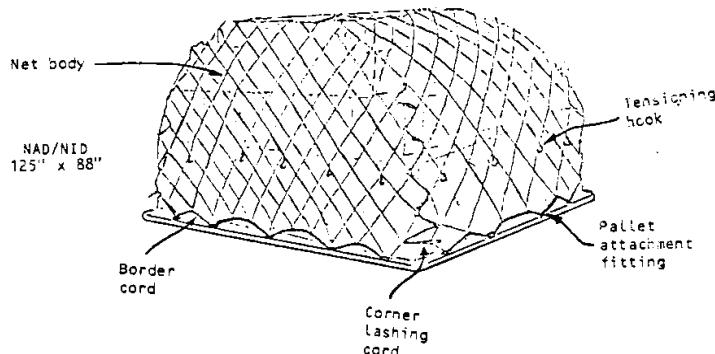
General Notes:

1. Only Container types, and compartment locations shown below, shall be utilised.
2. Empty Container positions (No Fits) next to an Uncertified Container position are NOT allowed – in any direction, i.e. Forward/Aft/Sideways.

Type of Unit and External Dimensions	Tare Weight (kg)	Usable Volume (ft ³)	Max Gross Weight (kg)	Limitations
 DKE / DKN 79" 64" 61.5" 60.4"	DKE 80 DKN 90	150	800	Baggage and Class 3 Cargo only May only be fitted in positions: Fwd - 23 L/R 25L/R Aft - Any container position apart from 42L/R
 DPE 61.5" 64" 47" 60.4"	70	120	800	Baggage and Class 3 Cargo only May only be fitted in positions: Fwd - 12 L/R 13L/R Aft - 43 L/R 44L/R

Note: No uncertified containers are to be carried in compartment positions 24L/R and 42L/R.

2.2.5 Allowable Loads for Damaged Nets



This information is provided to allow damaged nets to be usefully employed for return legs to LHR for repair. Only in exceptional circumstance should damaged nets be used ex LHR.

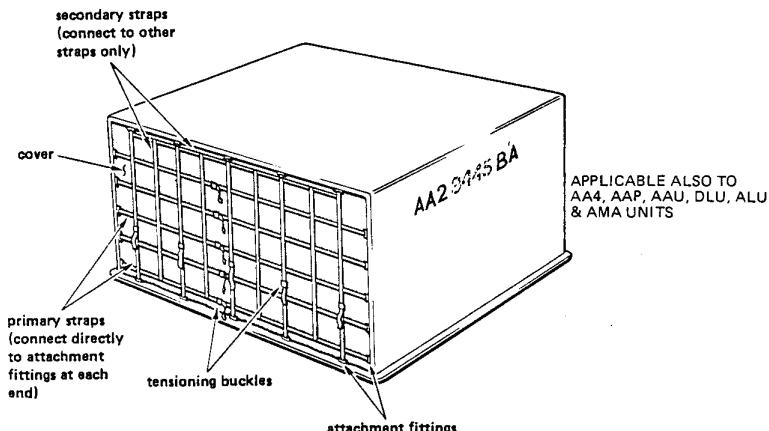
The table below shows the Max. Gross Weight at which the unit may be used, with various types of damage.

Item	Extent Of Damage	Remarks	Maximum Allowable Gross Wt. (kg)
Pallet Attachment Fittings	1 Damaged/missing per face	No two adjacent fittings to be damaged/missing (including around corners)	3016
	2*Damaged/missing per face		2050
Border cord	1 Broken cord per edge	No two adjacent cords to be broken (including around corners)	3016
	2*Broken cords per edge		2050
Net mesh below adjusting hooks	1 Broken cord per face	No two adjacent cords to be broken (including around corners)	3016
	2*Broken cords per face		2050
Net mesh above adjusting hooks	1 Broken cord		4040
	2*Broken cords per face		2050
Corner lashing cord	Any number missing	Replace with 950 kg approved tie-down rope	3016
Adjusting hooks	If more than 1 is missing from any one face do not use remainder on that face. Take up slack on other faces. If loss is associated with cut mesh, use reduction for damaged BELOW adjusting hook level.		6033

If any two of the conditions marked thus *occur on any face, the net must not be used.

Note: Two damaged nets may be used on one pallet at a Max. Gross Weight equal to twice the lowest allowable weight but not to exceed 6033 kg. Nets must be equally tensioned with pallet attachment fittings placed side by side.

2.2.6 Allowable Loads for Damaged Containers



Item	Extent of Damaged	Remark	Maximum Allowable Gross Wt. (kg)
Vertical Primary Straps	One cut or broken	No two adjacent straps to be cut or broken	4626
	Two cut or broken*		3000
Horizontal Primary Straps	One cut or broken	No two adjacent straps to be cut or broken	4626
	Two cut or broken*		3000
Secondary Straps	Any number cut or broken	Not allowed adjacent to broken primary strap	4626
Tension Buckles and Attachment Fittings	Any damaged part renders the primary straps to which it is attached as defective. To determine max. allow gross weight refer to Primary Strap Allowable.		See Primary Strap Allowables
Cover	Torn or cut cover is structurally allowable. Use polythene sheet to provide weather protection if necessary.		4626
Body Panels (Metal)	4" maximum dimension for hold or tear in each panel	Not allowed within 2" of edge rivets	4626
Stitched Strap Intersections	Up to 6 broken	Not more than 2 adjacent intersections allowed in any direction	4626

If both conditions marked thus * exist, the unit must not be used.

This information is provided to allow damaged units to be usefully employed for return to LHR for repair. Only in exceptional circumstances should units with damaged primary straps or fittings be used ex LHR.

2.3 Package Acceptance Data

2.3.1 Bulk Loading

2.3.1.1 Maximum Package Sizes in Compartment 3 and 4

The maximum dimensions of the packages which will pass through the lower hold cargo door openings are shown in the following table. The dimensions are approximate, so trial loading is recommended for packages with dimensions close to those given.

From the intersection of the appropriate height and width columns read off the maximum length. Where the exact height/width is not shown use the nearest height/width greater than the one being considered.

HEIGHT cm	WIDTH cm										
	25	50	75	100	125	150	175	200	225	250	265
165	711	622	559	495	432	394	318	318	318	318	318
150	838	724	610	559	495	445	406	368	343	318	318
140	978	826	711	622	546	495	445	394	368	343	343
127	1118	914	775	673	584	533	470	419	381	368	356
114	1118	1092	914	762	660	572	508	432	394	381	356
102	1118	1118	1041	876	737	648	559	495	445	406	394
89	1118	1118	1118	965	838	686	597	521	457	406	394
76	1118	1118	1118	1067	876	724	622	533	483	419	406
64	1118	1118	1118	1118	914	762	648	559	483	419	406
50	1118	1118	1118	1118	978	800	673	572	495	432	406
38	1118	1118	1118	1118	1054	838	711	597	508	445	406
25	1118	1118	1118	1118	1118	914	749	622	533	457	419
13	1118	1118	1118	1118	1118	1118	813	673	572	470	432

HEIGHT in	WIDTH in										
	10	20	30	40	50	60	70	80	90	100	104
66	280	245	220	195	170	155	125	125	125	125	125
60	330	285	240	220	195	175	160	145	135	125	125
55	385	325	280	245	215	195	175	155	145	135	135
50	440	360	305	265	230	210	185	165	150	145	140
45	440	430	360	300	260	225	200	170	155	150	140
40	440	440	410	345	290	255	220	195	175	160	155
35	440	440	440	380	330	270	235	205	180	160	155
30	440	440	440	420	345	285	245	210	190	165	160
25	440	440	440	440	360	300	255	220	190	165	160
20	440	440	440	440	385	315	265	225	195	170	160
15	440	440	440	440	415	330	280	235	200	175	160
10	440	440	440	440	440	360	295	245	210	180	165
5	440	440	440	440	440	440	320	265	225	185	170

2.3.1.2 Maximum Package Sizes in Compartment 5

The following figure and tables give the maximum size of package which can be accommodated in compartment 5.

Note: Bulk hold divider net installed at STN.1980.

Dimensions for both upright and tilted packages are provided:

Upright packages of heavier nature loaded by mechanical means.

Tilted packages will be lighter and hand manoeuvrable.

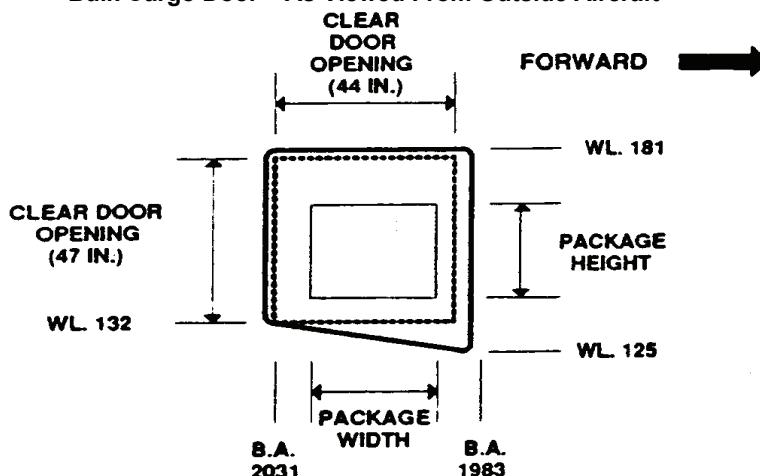
Bulk Cargo Door – As Viewed From Outside Aircraft

Table 1 Package Sizes – Aft Cargo Main Door, Bulk Hold, Upright Package – Load Aft of Door

Height (in)	Width (in)									
	10	20	30	40	50	60	70	80	90	100
Length (in)										
47	95	95	95	95	95	95	95	80	73	67
43	114	114	114	114	114	114	114	80	73	67
39	133	133	133	133	133	133	133	80	73	67
36	148	148	148	148	148	148	148	80	73	67
32	166	166	166	166	166	166	160	80	73	67
4–28	180	180	180	180	180	180	160	80	73	67

**Table 2 Package sizes – Bulk Cargo Door, Upright Package –
Loaded Forward of Door**

Note: Outlined area on right indicates loading packages aft of door.

Height (in)	Width (in)										
	4	8	12	16	20	24	28	32	36	40	44
	Length (in)										
47	95	95	95	95	95	95	95	95	95	95	95
43	114	114	114	114	114	114	114	114	114	114	110
39	133	133	133	133	133	133	130	125	120	120	120
36	148	148	148	148	145	135	130	125	120	120	120
32	166	166	165	155	150	140	135	130	125	120	120
28	175	175	170	160	155	145	135	130	125	120	120
24	175	175	175	165	155	145	135	130	125	120	120
20	175	175	175	170	155	145	135	130	125	120	120
16	175	175	175	175	160	150	140	135	125	120	120
12	175	175	175	175	165	155	145	135	130	125	120
8	175	175	175	175	175	160	150	140	130	125	120
4	175	175	175	175	175	170	155	145	135	125	120

Table 3 Package Sizes – Bulk Cargo Door, Tilted Package – Loaded Forward of Door

Height (in)	Width (in)									
	4	8	12	16	20	24	28	32	36	40
Length (in)										
56	46	46	46	46						
52	68	68	68	68	68					
48	90	90	90	90	90	90	90	90	90	90
44	110	110	110	110	110	110	110	110	110	110
40	128	128	128	128	128	128	128	125	120	120
36	148	148	148	148	145	135	130	125	120	120
32	166	166	165	155	150	140	135	130	125	120
28	175	175	170	160	155	145	135	130	125	120
24	175	175	175	165	155	145	135	130	125	120
20	175	175	175	170	155	145	135	130	125	120
16	175	175	175	175	160	150	140	135	125	120
12	175	175	175	175	165	155	145	135	130	125
8	175	175	175	175	175	160	150	140	130	125
4	175	175	175	175	175	170	155	145	135	125

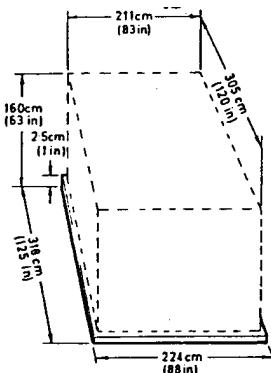
2.3.2 ULD Loading In Compartments 1, 2, 3 and 4

The maximum package sizes are those which can be fitted within the following load envelopes:

AA2, AAP, PA and

P1 TYPES

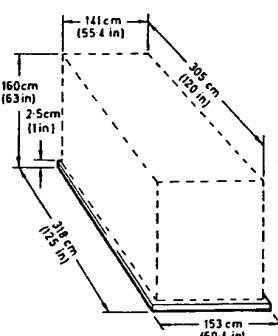
88 in x 125 in ULD
(224 cm x 318 cm)



CUBIC CAPACITY 10.12 cu m
 357.4 cu ft

AW TYPE

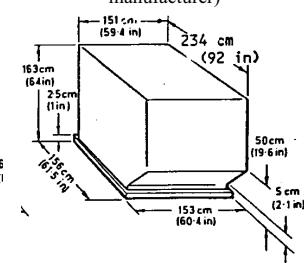
60.4 in x 125 in ULD
(153 cm x 318 cm)



6.75 cu m
238.5 cu ft
AA4 and UA Types
88 x 125 in Igloo
(224 cm x 318 cm)

CUBIC CAPACITY 9.40 cu m
 332.2 cu ft

AV TYPE
Half Width Container
(External dimensions shown,
internal dimensions less but vary
slightly depending on
manufacturer)



4.33 cu m
153.0 cu ft

LOAD ENVELOPES OF PALLETS, CONTAINERS AND IGLOOS



2.4 Cargo Restraint

2.4.1 General

A. Classification of Load:

- Class I An item weighing 250 kg or more.
- CLASS II An item weighing between 75 kg and 250 kg.
- Class III An item weighing 75 kg or less.

- B. Class I items shall not be stacked on Class II or Class III items. Class I items may be stacked on other Class I items in ULDs providing there is no likelihood of the lower load being crushed.
- C. Care should be exercised when loading all classes of cargo so that the accumulated load is inherently stable.
- D. Items requiring individually lashing:

1. All Class I items.
2. All Class II if the hold or container/igloo is less than $\frac{3}{4}$ volumetrically full.
3. Items of any kind which, due to their nature, could constitute a hazard if not restrained.

E. Approved tie-down materials and equipment:

1. 8 mm diameter (1" circumference) polypropylene rope having a minimum breaking strength of 907 kg (2000 lb), which reduces to 453 kg (1000 lb) min when knotted.
2. Rope having a minimum breaking strength of 907 kg (2000 lb).

Note: Reference to table 2 illustrates that because of the number of ropes required, and the practical need to use more than one rope per tie-down ring, ropes larger than 8 mm diameter are impracticable.

3. 45 mm (1 $\frac{3}{4}$ ") tie-down straps having a minimum breaking strength of 2270 kg (5000 lb). These must only be used with 2270 kg double stud fittings.
4. Single-stud fittings having a minimum strength of 900 kg (2000 lb) in any direction.
5. Double-stud fittings having a minimum strength of 2270 kg (5000 lb) in any direction.

Single Stud tie-down ring	– Stores Code WZAR 0002
Double Stud tie-down ring	– Stores Code WBLR 0001
Tie-down strap (2270 kg/5000 lb)	– Stores Code WWAS 0003

2.4.2 Restraint

- A. This section relates to all lower deck compartments where load is secured directly to the aircraft floor (see Section *Restraint for Loads in ULDs* for restraint within ULDs).
- B. The number of restraint ropes or straps for items of differing weight is shown in tables 1 and 2, and must be used in conjunction with the notes following the tables.
- C. Compartment Nets

The Transverse net between compartment 4 and 5 (Stn 1980) must be erected whenever there is load in compartment 5.

1. Section 52

The transverse net at Stn 2060 is to be erected whenever there is load in Section 52.

2. Section 51

The transverse nets at Stn 1980 and Stn 2060 and the door net must be erected whenever there is load in section 51.

Note: All damage to webbing and restraint/attachment fittings must be reported to the Ground Engineer for rectification/replacement.

Compartment nets must be replaced if more than one net attachment point is damaged or missing.

Compartment nets with one damaged/missing attachment point can still be used but with the following limitations. The load adjacent to the damaged net must be reduced to 50% of the maximum compartment load, as shown in Maximum Loads Section [2.2.1 – 2.2.3](#) of this manual.

If no net is fitted the load in the adjacent compartments must be restrained in accordance with the tables below.

Table 1 – Number of Restraint Attachment Points When Using 2270 kg Straps and Double-stud Fittings

Wt. of Item kg	Minimum Number of Floor Attachment Points			
	Fwd/Aft	Sideways	Upwards	
Up to 1000	2	4	4	For interpolation between values in table. Each strap can restrain this number of kg in the direction specified.
1001–1500	4	4	6	
1501–2000	4	6	8	
2001–2500	4	8	8	
2501–3000	6	8	10	
3001–3500	6	10	12	
3501–4000	6	12	14	
	681	378	312	←

Table 2 – Number of Restraints When Using 950 kg Rope with Single-stud Fittings

Wt. of Item kg.	Minimum Number of Restraint Attachments			
	Fwd/Aft	Sideways	Upwards	
Up to 250	2	4	4	For interpolation between values in table. Each strap can restrain this number of kg in the direction specified.
251 - 500	4	6	8	
501 - 1000	8	12	16	
1001 - 1500	10	18	22	
	151	84	69	←

Note 1: When determining the number of ropes/straps effective in providing restraint in a particular direction, all those within 45° of that direction may be counted.

Note 2: For restraint in a particular direction, each 2270 kg strap must terminate at a different attachment point (i.e. not more than one strap per fitting per restraint direction) and not less than 20 in apart.

Note: This allows up to four straps per fitting comprising 1 forward, 1 aft, 1 sideways and 1 upwards.

Note 3: Where ropes are used two ropes per fitting are allowed for each restraint direction.

Note 4: Tie down straps rated at 2270 kg may be used in conjunction with single stud fittings providing the number of straps used is determined from Table 2 and the quantity in each direction may be reduced by not more than half of the number shown.

2.4.3 Restraint for Loads in ULDs

- A. This section relates to all ULDs, including containers, igloos and pallets.
- B. The number of restraint ropes or straps for items of differing weight is shown in tables 3 and 4 and may be used in conjunction with the notes following the table.

Table 3 – Number of Restraints When Using 2270 kg Straps and Double Stud Fittings in ULDs

Wt. of Item kg	Minimum Number of Floor Attachments Points		
	Fwd/Aft and Sideways	Upwards	
Up to 1000	4	6	For interpolation between values in table. Each strap can restrain this number of kg in the direction specified.
1001 - 2000	6	10	
2001 - 3000	8	14	
3001 - 4000	10	18	
4001 - 5000	12	22	
	524	367	←

Table 4 – Number of Restraints When Using 950 kg Rope with Single-stud Fittings in ULDs

Wt. of Item kg	Minimum Number of Floor Attachments Points		
	Fwd/Aft and Sideways	Upwards	
Up to 250	4	4	For interpolation between values in table. Each strap can restrain this number of kg in the direction specified.
251 - 500	6	8	
501 - 1000	10	14	
1001 - 1500	14	20	
	116	82	←

Note 1: When determining the number of ropes/straps effective in providing restraint in a particular direction, all those within 45° of that direction may be counted.

Note 2: For restraint in a particular direction, each 2270 kg strap must terminate at a different attachment point (i.e. not more than one strap per fitting per restraint direction).

Note: This allows up to four straps per fitting, comprising 1 forward, 1 aft, 1 sideways, and 1 upwards.

Note 3: Where ropes are used two ropes per fitting are allowed for each restraint direction.



- Note 4:** Tie-down straps rated at 2270 kg may be used in conjunction with single-stud fittings providing the number of straps used is determined from Table 2 and the quantity in each direction may be reduced by not more than half of the number shown.
- Note 5:** Tie-down attachment points must not be less than 16" apart, either on pallets or along the open side of igloos or containers, when using 2270 kg straps or not less than 5" apart when using ropes.
- Note 6:** When securing to pallets, tie-down points must not be less than 10" from the corner of the pallet.
- Note 7:** The distribution of ropes in relation to the item must be balanced for each direction of restraint, e.g. where the minimum number of straps for forward restraint is 7, and attachment points exist only along the sides, then 4 straps per side must be used.
- Note 8:** All pallet, container/igloo restraints must be serviceable and engaged when cargo is individually restrained as described above.



2.5 Load Spreading

2.5.1 Load Spreading for Bulk Loading on Aircraft Floor

A. Table 1 is to be used to determine if load spreading is required for a particular piece of cargo to be stowed in the underfloor compartments.

B. Terms Used:

Package length: Must be measured in relation to the fore/aft direction in the aircraft; i.e. the length of the aircraft hold taken up by the package.

Package width: Must be measured in relation to the athwartship direction in the aircraft; i.e. the width of the aircraft hold taken up by the package.

C. General Notes

1. Where a package is fitted with battens they may be ignored providing:
 - a. The overall dimensions of the package and the associated allowable weight in Table 1 show that spreaders are not required.
 - b. The package placed in the aircraft with battens running fore/aft.
 - c. The spacing between the battens is not more than 24".
2. Where spacing of battens exceeds 24", the actual contact area and Table 1, shall be used to determine if spreaders are required.
3. Packages with battens should be placed in the aircraft with the battens running fore/aft. Where this is not practical, the actual batten widths must be added to obtain the package contact length, and Table 1 used to determine if spreaders are required (see Fig.1).

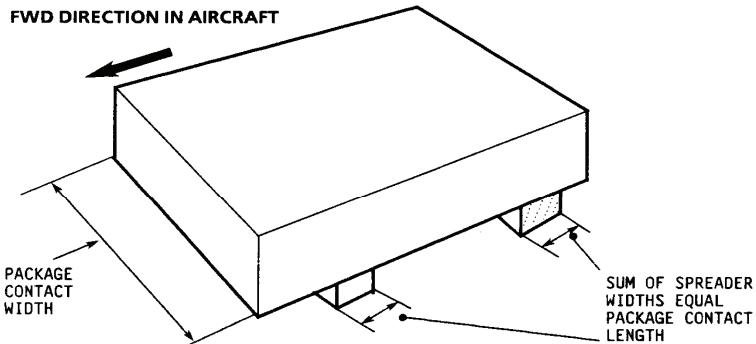


Table 1 Loading Intensity – Hold 5

 TABLE 1 - Loading Intensity $68\text{kg}/\text{ft}^2 = 756\text{ kg/m}^2$

HOLD 5 FOR 747 AIRCRAFT

Maximum Allowable Weight Kgs	CONTACT LENGTH INS CM															HOLD 5 FOR 747 AIRCRAFT						
	4 10	8 20	12 30	16 40	20 50	24 60	28 70	32 80	36 90	40 100	44 110	48 120	52 130	56 140	60 150	64 160	68 170	72 180	76 190	80 200	84 210	
inches cm																						
4 10	8	15	23	30	38	45	53	60	68	76	83	91	98	106	113	121	128	136	144	151	159	
8 20	15	30	45	60	76	91	106	121	136	151	166	181	196	212	227	242	257	272	287	302	317	
12 30	23	45	68	91	113	136	159	181	204	227	249	272	295	317	340	363	385	408	431	453	476	
16 40	30	60	91	121	151	181	212	242	272	302	332	363	393	423	453	484	514	544	574	604	635	
20 50	38	76	113	151	189	227	264	302	340	378	416	453	491	529	567	604	642	680	718	756	793	
24 60	45	91	136	181	227	272	317	363	408	453	499	544	589	635	680	725	771	816	861	907	952	
28 70	53	106	159	212	264	317	370	423	476	529	582	635	687	740	793	846	899	952	1005	1058	1111	
32 80	60	121	181	242	302	363	423	484	544	604	665	725	786	846	907	967	1028	1088	1148	1209	1269	
36 90	68	136	204	272	340	408	476	544	612	680	748	816	884	952	1020	1088	1156	1224	1292	1360	1428	
40 100	76	151	227	302	378	453	529	604	680	756	831	907	982	1058	1133	1209	1284	1360	1486	1511	1587	
44 110	83	166	249	332	476	499	582	665	748	831	914	997	1080	1163	1247	1330	1413	1496	1579	1662	1745	
48 120	91	181	272	363	453	544	635	725	816	907	997	1088	1179	1269	1360	1451	1541	1632	1723	1813	1904	
52 130	98	196	295	393	491	589	687	786	884	982	1080	1179	1277	1375	1473	1572	1670	1768	1866	1964	2063	
56 140	106	212	317	423	529	635	740	846	952	1058	1163	1269	1375	1481	1587	1692	1798	1904	2010	2116	2221	
60 150	113	227	340	453	567	680	793	907	1020	1133	1247	1360	1473	1587	1700	1813	1927	2040	2153	2267	2380	
64 160	121	242	363	484	604	725	846	967	1088	1209	1330	1451	1572	1692	1813	1934	2055	2176	2299	2418	2539	
68 170	128	257	385	514	642	771	899	1028	1156	1284	1413	1541	1670	1798	1927	2055	2184	2312	2440	2569	2697	
72 180	136	272	408	544	680	816	952	1088	1224	1360	1496	1632	1768	1904	2040	2176	2312	2448	2584	2720	2856	
76 190	144	287	431	574	718	861	1005	1148	1292	1436	1579	1723	1866	2010	2153	2299	2440	2584	2728	2871	3015	
80 200	151	302	453	604	756	907	1058	1209	1360	1511	1662	1813	1964	2116	2267	2418	2569	2720	2871	3022	3173	
84 210	159	317	476	635	793	952	1111	1269	1428	1587	1745	1904	2063	2221	2380	2539	2697	2856	3015	3173	3332	
88 220	166	332	499	665	931	997	1163	1330	1496	1662	1828	1995	2161	2327	2493	2660	2826	2992	3158	3324	3491	
92 230	174	348	521	695	869	1043	1216	1390	1564	1738	1916	2085	2259	2433	2607	2780	2954	3128	3302	3476	3649	
96 240	181	363	544	725	907	1088	1269	1451	1632	1813	1995	2176	2357	2539	2720	2901	3083	3264	3445	3627	3808	
100 250	189	378	567	756	944	1133	1322	1511	1700	1889	2078	2267	2456	2644	2833	3022	3211	3400	3589	3778	3967	
104 260	196	393	589	786	982	1179	1375	1572	1768	1964	2161	2357	2554	2750	2947	3143	3340	3536	3732	3929	4125	
108 270	204	408	612	816	1020	1224	1428	1632	1836	2040	2244	2448	2652	2856	3060	3264	3468	3672	3876	4080	4284	
112 280	212	423	635	846	1058	1269	1481	1692	1904	2116	2827	2589	2750	2962	3173	3385	3596	3808	4020	4231	4443	
116 290	219	438	657	876	1096	1315	1534	1753	1972	2191	2410	2629	2848	3068	3287	3506	3725	3944	4163	4382	4601	
120 300	227	453	680	907	1133	1360	1587	1813	2040	2267	2493	2720	2947	3173	3400	3627	3853	4080	4307	4533	4760	

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TABLE 1(contd.) - Loading Intensity 68kg/ft² = 756 kg/m² HOLD 5 FOR 747 AIRCRAFT

Maximum Allowable Weight Kgs	CONTACT LENGTH IN INS CM														
	88 220	92 230	96 240	100 250	104 260	108 270	112 280	116 290	120 300		124 310	128 320	132 330	136 340	140 350
inches cm	4 10	166	174	181	189	196	204	212	219	227	234	242	249	257	264
					LENGTH LIMIT COMPT 51 & 52										
	8 20	332	348	363	378	393	408	423	438	453	468	486	497	514	529
	12 30	499	521	544	567	589	612	685	657	680	703	723	748	771	793
	16 40	665	695	725	756	786	816	846	876	907	939	967	997	1027	1057
	20 50	831	869	907	944	982	1020	1058	1096	1183	1171	1209	1247	1284	1322
	24 60	997	1043	1088	1133	1179	1224	1269	1315	1360	1405	1451	1496	1541	1587
	28 70	1163	1216	1269	1322	1375	1428	1481	1538	1587	1639	1692	1745	1798	1851
	32 80	1330	1390	1451	1511	1572	1632	1692	1753	1813	1874	1934	1995	2055	2116
	36 90	1496	1564	1632	1700	1768	1836	1904	1972	2040	2108	2176	2244	2312	2380
	40 100	1662	1738	1813	1889	1964	2040	2116	2191	2267	2342	2418	2493	2569	2644
	44 110	1828	1916	1995	2078	2161	2244	2327	2410	2493	2576	2660	2743	2826	2909
	48 120	1995	2085	2176	2276	2357	2248	2539	2629	2720	2811	2901	2992	3083	3173
	52 130	2161	2259	2357	2456	2554	2652	2750	2848	2947	3049	3143	3241	3340	3438
	56 140	2327	2433	2539	2644	2750	2856	2962	3068	3173	3279	3385	3491	3702	3802
	60 150	2493	2607	2720	2833	2947	3060	3173	3287	3400	3513	3627	3740	3853	3967
	64 160	2660	2780	2901	3022	3143	3264	3385	3506	3627	3747	3868	3989	4110	4231
	68 170	2826	2954	3083	3211	3340	3468	3596	3725	3853	3982	4110	4289	4367	4496
	72 180	2992	3128	3264	3400	3536	3672	3808	3944	4080	4216	4352	4488	4624	4760
	76 190	3158	3302	3445	3589	3732	3876	4020	4163	4307	4450	4594	4737	4881	5024
	80 200	3324	3476	3621	3778	3929	4080	4231	4382	4533	4684	4836	4987	5138	5289
	84 210	3491	3649	3808	3967	4125	4284	4443	4601	4760	4919	5077	5236	5395	5553
	88 220	3657	3823	3989	4156	4322	4488	4654	4820	4987	5153	5319	5485	5652	5818
	92 230	3823	3997	4171	4344	4518	4692	4866	5040	5213	5387	5561	5735	5908	6082
	96 240	3989	4171	4352	4533	4717	4896	5077	5259	5440	5621	5803	5984	6165	6347
	100 250	4156	4344	4533	4722	4911	5100	5289	5478	5667	5856	6044	6233	6422	6611
	104 260	4322	4518	4717	4911	5108	5304	5500	5697	5893	6090	6286	6483	6679	6876
	108 270	4488	4692	4896	5100	5304	5508	5712	5916	6120	6324	6528	6732	6936	7140
	112 280	4654	4866	5077	5289	5500	5712	5926	6135	6347	6558	6770	6981	7193	7404
	116 290	4820	5040	5259	5478	5697	5916	6135	6354	6573	6792	7016	7231	7450	7669
	120 300	4987	5213	5440	5667	5893	6120	6347	6573	6800	7027	7253	7480	7707	7933

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4. Where it is necessary to use spreaders: these must be placed with the length running fore/aft, and at not more than 24" spacing.
5. Where spreaders are bowed, they should be placed with the bow upwards in the centre and bowed ends downwards.

D. General Limitations

1. Do not load Class 1 packages on top of any other package.
2. If any package has been loaded on to spreader do not load other packages on top of the original package or on top of the spreader overhang.
3. The total load within any fore and aft (contact) length must not exceed the maximum value of load for that length in *Table 1 Loading Intensity – Hold 5* appropriate to the compartment.

E. Spreader Requirements

1. To calculate if spreaders are required – Use *Table 1 Loading Intensity – Hold 5*.

The intersection of the 'CONTACT LENGTH' and 'CONTACT WIDTH' of the package shows the **maximum** permitted weight of the package without using spreaders.

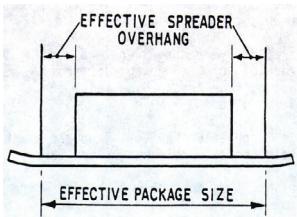
Enter the table using sizes equal to or less than the actual contact length and width – e.g. for 67 cm use 60 cm.

If the package exceeds this weight – spreaders are required.

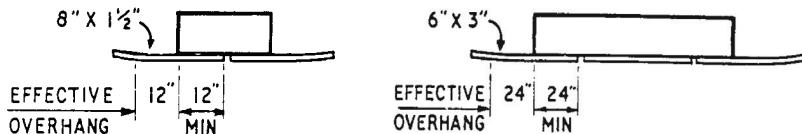
F. Effective Length of Spreaders

1. When a spreader is placed beneath a package and the spreader overhang is considerable, only a certain amount of the overhang will work effectively as a spreader (see Fig. 2).

2. The amount of the overhang which is effective is determined by the intrinsic stiffness of the material and its physical dimensions. For each timber size the effective overhang is shown in *Table 2 – Effective Length of Spreaders*.



3. Where spreaders of adequate length are not available, two or more spreaders may be used providing the length of spreader beneath the package is not less than the effective spreader overhang for the size of spreaders used (see *Table 2 – Effective Length of Spreaders* and Fig.3).



4. Where length of spreader available produces an overhang less than the effective overhang shown in *Table 2 – Effective Length of Spreaders*, the actual overhang shall be used when determining the effective package size, i.e. actual length plus spreader overhang at each end.

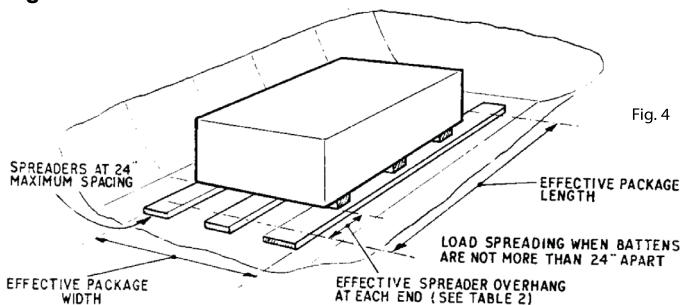
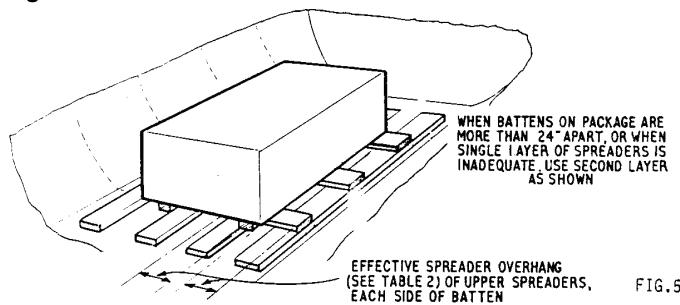
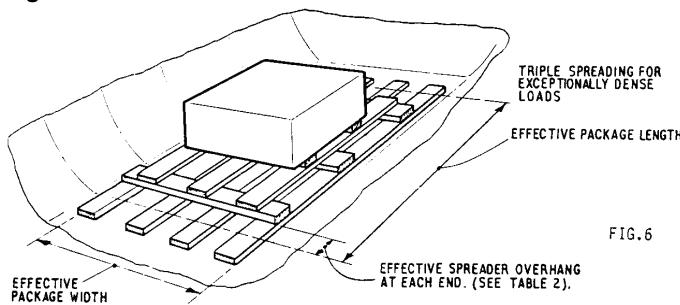
Table 2 – Effective Length of Spreaders

Spreaders Dimensions width x height	Weight of Spreaders per ft length, kg	Effective Length of Overhang at each end, in
8 X 1½	1.25	12
4 X 2	0.83	16
6 X 3	1.88	24
4 X 4	1.67	27



G. To Calculate Spreader Requirements

1. Because spreaders must run fore/aft, the width of the package will not be (significantly) increased.
2. For the spreader size chosen, determine the effective length of the spreader overhang, from *Table 2 – Effective Length of Spreaders*.
3. Determine the effective package length by adding the effective spreader overhang to each end of the package length (i.e. effective package length = actual package length plus twice the effective spreader overhang) see Fig. 4.
4. Refer to *Table 1 Loading Intensity – Hold 5* and enter the left hand end at the package contact width and obtain the allowable weight for the effective package length.
5. If package weight, plus spreader weight, is within this allowable weight, the spreading is adequate (see *Table 2 – Effective Length of Spreaders* for weight per foot length).
6. If the spreading is not adequate, a second layer of spreaders may be used with the lower layer (in contact with the floor) running fore/aft, and the upper layer running athwartships (see figure 5).
7. The effective width can now be taken as the spreader length of the upper layer of spreaders within the limit of effective spreader overhang.
8. Determine the effective package length by adding at each end the effective spreader overhang for the bottom layer of spreaders to the package length.
9. Refer to *Table 1 Loading Intensity – Hold 5* and enter the left hand end at the contact width for the new effective width and obtain the allowable weight for the effective package length.
10. If package weight, plus spreader weight is within the allowable weight in *Table 1 Loading Intensity – Hold 5*, the spreading is adequate.
11. Where the transverse spreading as shown in Fig. 5 is inadequate, and the package or spreader dimensions approach the aircraft floor width, a third layer of spreaders running fore/aft may be used as shown in Fig. 6.

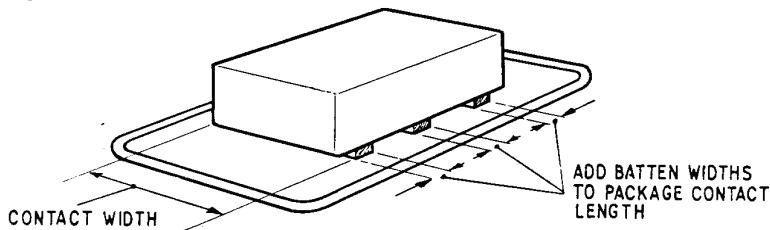
Figure 4**Figure 5****Figure 6**

2.5.2 Load Spreading for Packages in ULDs or on Pallets

A. General Limitations

1. Where a package is fitted with battens, these will determine the contact area of the package with the floor and hence the package length and width dimensions.
2. However, if the package is positioned on the unit with the battens running along the length of the unit (i.e. across the width of the aircraft), the existence of the battens can be ignored providing:
 - a. The overall dimensions of the package, and the associated allowable weight in Table 1A show that spreaders are not required.
 - b. The spacing between the battens is not more than 24".
3. Where package dimensions make it necessary to place them with battens running across the width of the unit, the actual batten widths must be added to obtain the package contact length and Table 1A used to determine if spreaders are required (see Fig.7). If spreaders are required see Fig.10.

Figure 7



4. When using spreaders it is preferable, but not essential, that the bottom layer of spreaders is laid on the ULD at 90° to the direction in which the ULD will move along the aircraft roller system.
5. Class I items shall not be stacked on Class II or Class III items. Class I items may be stacked on other Class I items in ULDs providing there is no likelihood of the lower load being crushed.
6. If any package has been loaded on to spreaders, do not load other packages on top of the original package or on top of the spreader effective overhang.



7. The total load of the unit, including packages, spreaders, and the unit itself, shall not exceed the maximum unit load stated in *Section 2.2.2*.
8. Where spreaders are bowed, they should be placed with the bow upwards in the centre and bowed ends downwards.

B. Spreader Requirement

- a. To calculate if spreaders are required use Table 1A. The intersection of the 'contact length' and the 'contact width' of the package shows the maximum permitted weight of the package without using spreaders.

Enter the table using sizes equal to or less than the actual contact length and width, e.g. if actual dimension is 50" use 48".

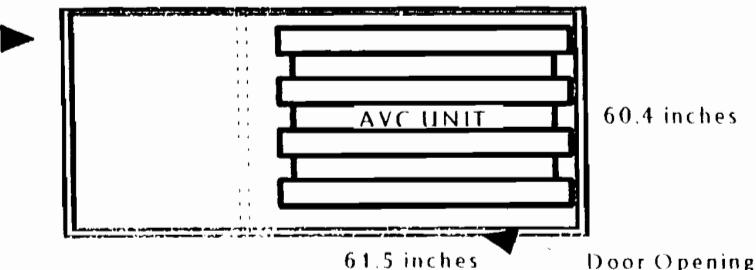
Table 1A

 TABLE 1A - Loading Intensity 90.7kg/ft² = 1008 kg/m²

Maximum Allowable Weight Kgs	UID LENGTH INS CM															
	4 10	8 20	12 30	16 40	20 50	24 60	28 70	32 80	36 90	40 100	44 110	48 120	52 130	56 140	60 150	
4	10	11	20	31	40	51	60	71	80	91	101	111	121	131	141	151
8	20	20	40	60	80	101	121	141	161	181	201	221	241	261	283	303
12	30	31	60	91	121	151	181	212	241	272	303	332	367	393	423	453
16	40	40	80	121	161	201	241	283	323	363	403	427	484	524	564	604
20	50	51	101	151	201	252	303	352	403	453	504	555	604	655	705	756
24	60	60	121	181	241	303	363	427	484	544	604	665	725	785	847	907
28	70	71	141	212	283	352	427	493	564	635	705	776	847	916	987	1057
32	80	80	161	241	323	403	484	564	645	725	805	887	967	1048	1128	1209
36	90	91	181	272	363	453	544	635	725	816	907	997	1088	1179	1270	1360
40	100	101	201	303	403	504	604	705	805	907	1008	1108	1209	1309	1411	1511
44	110	111	221	332	427	555	665	776	887	997	1108	1219	1329	1440	1551	1563
48	120	121	241	367	484	604	725	847	967	1088	1209	1329	1451	1572	1692	1813
52	130	131	261	393	524	655	785	916	1048	1179	1309	1440	1572	1703	1833	1964
56	140	141	283	423	564	705	847	987	1128	1270	1411	1551	1692	1833	1975	2116
60	150	151	303	453	604	756	907	1057	1209	1360	1511	1663	1813	1964	2116	2267
64	160	161	323	484	645	805	967	1128	1289	1451	1612	1773	1935	2096	2256	2417
68	170	171	343	513	685	856	1028	1199	1371	1541	1712	1884	2055	2267	2397	2569
72	180	181	363	544	725	907	1088	1269	1451	1632	1813	1995	2176	2357	2539	2720
76	190	191	383	575	765	957	1148	1340	1531	1723	1915	2015	2297	2488	2680	2871
80	200	201	403	604	805	1008	1209	1411	1612	1813	2015	2216	2417	2617	2821	3023
84	210	212	423	635	847	1057	1269	1481	1692	1904	2116	2327	2539	2751	2961	3173
88	220	221	443	665	887	1108	1329	1551	1773	1995	2216	2437	2660	2881	3103	3324
92	230	232	464	695	927	1158	1391	1621	1853	2085	2317	2555	2780	3012	3244	3476
96	240	241	484	725	967	1209	1451	1692	1935	2176	2417	2660	2901	3143	3385	3627
100	250	252	504	756	1008	1259	1511	1763	2015	2267	2519	2771	3023	3275	3525	3777
104	260	261	524	785	1048	1309	1572	1833	2096	2357	2619	2881	3143	3405	3667	3929
108	270	272	544	816	1088	1360	1632	1904	2176	2448	2720	2992	3264	3536	3808	4080
112	280	283	564	847	1128	1411	1692	1975	2256	2539	2821	3769	3387	3667	3949	4231
116	290	292	584	876	1168	1461	1753	2045	2337	2629	2921	3213	3505	3797	4091	4383
120	300	303	604	907	1209	1511	1813	2116	2417	2720	3023	3324	3627	3929	4231	4533

DIRECTION OF SPREADERS
IS ALONG LENGTH OF UNITS

SPREADERS MUST SIT
WITHIN, NOT ON TOP OF,
BASE OR PALLET EDGE
RAILS



LOAD SPREADING FOR UIDS: AKC, ALU, AAU, RAU, & ANY PALLET LOAD OVER 160"
LONG. USED EXCLUSIVELY ON 747 A/C

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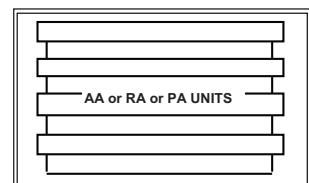


B747 Load and Balance

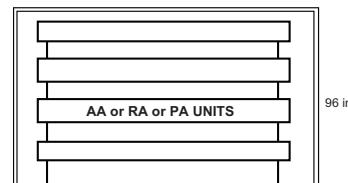
Table 1A (Load Intensity 90.7 kg/sq ft) (cont'd)

Maximum Allowable Weight - kg	ULD Length in. (cm)										ULD Length in. (cm)							
	68	72	76	80	84	88	92	96	100	104	108	112	116	120	124			
in. cm	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310			
4 10	171	181	192	201	212	221	232	241	252	261	272	283	292	330	312			
8 20	343	363	383	403	423	443	464	484	504	524	544	564	584	604	624			
12 30	513	544	575	604	635	665	695	725	756	785	816	847	876	907	937			
16 40	685	725	765	805	847	887	927	967	1008	1048	1088	1128	1168	1209	1252			
20 50	856	907	957	1008	1057	1108	1158	1209	1259	1309	1360	1411	1461	1511	1561			
24 60	1028	1088	1148	1209	1269	1329	1391	1451	1511	1572	1632	1692	1753	1813	1873			
28 70	1199	1269	1340	1411	1481	1551	1621	1692	1763	1833	1904	1975	2045	2116	2185			
32 80	1371	1451	1531	1612	1769	1773	1853	1935	2015	2096	2176	2256	2337	2417	2497			
36 90	1541	1632	1723	1813	1904	1995	2085	2176	2267	2357	2448	2539	2629	2720	2811			
40 100	1712	1813	1915	2015	2116	2216	2317	2417	2519	2619	2720	2821	2921	3023	3123	↓	AL UNIT MAX LOAD LIMIT 3175 KG	
44 110	1884	1995	2015	2116	2327	2437	2555	2660	2771	2881	2992	3103	3213	3324	3435			
48 120	2055	2176	2297	2417	2539	2660	2780	2901	3023	3143	3264	3387	3505	3627	3748			
52 130	2267	2357	2488	2617	2751	2881	3012	3143	3275	3405	3536	3667	3797	3929	4065			
56 140	2397	2539	2680	2821	2961	3103	3244	3385	3525	3667	3808	3949	4091	4231	4372			
60 150	2569	2720	2871	3023	3173	3324	3476	3627	3777	3929	4080	4231	4383	4533	4684			
64 160	2740	2901	3065	3224	3385	3547	3707	3868	4029	4191	4352	4513	4675	4836	4996	←	AL & PA MAX LOAD LIMIT 5102 KG	
68 170	2912	3083	3253	3425	3596	3768	3939	4111	4281	4453	4624	4797	4967	5137	5309			
72 180	3083	3264	3455	3627	3808	3989	4171	4352	4533	4715	4896	5077	5258	5440	5621			
76 190	3253	3445	3637	3828	4020	4211	4403	4593	4785	4976	5168	5360	5551	5743	5933			
80 200	3425	3627	3828	4029	4231	4432	4635	4836	5037	5239	5440	5641	5843	6044	6245			
84 210	3596	3808	4021	4231	4443	4655	4865	5077	5289	5500	5712	5924	6135	6347	6559			
88 220	3768	3969	4211	4432	4655	4876	5097	5319	5541	5763	5984	6205	6427	6649	6871			
92 230	3939	4171	4403	4635	4865	5097	5329	5561	5792	6024	6256	6488	6720	6951	7183			
96 240	4111	4352	4593	4836	5077	5319	5561	5803	6044	6289	6528	6769	7012	7253	7495			
100 250	4281	4533	4785	5037	5289	5541	5792	6044	6296	6548	6800	7052	7304	7556	7808			
104 260	4453	4715	4976	5239	5500	5763	6024	6289	6548	6812	7072	7333	7596	7857	8120			
108 270	4624	4896	5168	5440	5712	5984	6256	6528	6800	7072	7344	7616	7888	8160	8432			
112 280	4797	5077	5360	5641	5924	6205	6488	6769	7052	7333	7616	7901	8180	8463	8744			
116 290	4967	5258	5551	5843	6135	6427	6720	7012	7304	7596	7888	8180	8472	8764	9056			
120 300	5137	5440	5743	6044	6347	6649	6951	7253	7556	7857	8160	8463	8764	9067	9369			

SPREADERS MUST SIT WITHIN, NOT ON TOP OF, BASE OR
PALLET EDGE RAILS



125 in.



96 in.

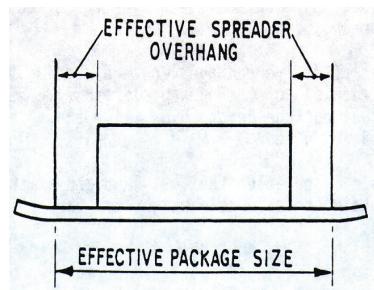
88 in.

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C. Effective Length of Spreaders

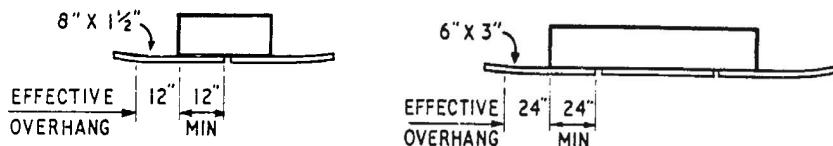
1. When a spreader is placed beneath a package and the spreader overhang is considerable, only a certain amount of the overhang will work effectively as a spreader.
2. The amount of the overhang which is effective is determined by the intrinsic stiffness of the material and its physical dimensions. For each timber size the effective overhang is shown in *Table 2 – Effective Length of Spreaders*.

Figure 8



3. Where spreaders of adequate length are not available, two or more spreaders may be used providing the length of spreader beneath the package is not less than the effective overhang for the size of spreaders used (see *Table 2 – Effective Length of Spreaders* and *Figure 9*).

Figure 9



4. Where length of spreader available produces an overhang less than the effective overhang shown in *Table 2 – Effective Length of Spreaders*, the **actual** overhang shall be used when determining the effective package size, i.e. actual length plus spreader overhang at each end.

**Table 2 – Effective Length of Spreaders**

Spreaders Dimensions width x height	Weight of Spreaders per ft length, kg	Effective Length of Overhang at each end, in
8 X 1½	1.25	12
4 X 2	0.83	16
6 X 3	1.88	24
4 X 4	1.67	27

D. To Collate Length of Spreaders Required

1. Because the spreaders should preferably run lengthwise along the pallet it is generally better and uses less timber to place the package across the spreaders, although providing the spreaders are shown to be adequate the package can be placed in either direction.
2. For the spreader size chosen, determine the effective length of the spreader overhang.
3. Determine the effective package length by adding the effective spreader overhang to each end of the package length (i.e. effective package length = actual package length plus twice the effective spreader overhang) see *Figure 10*.
4. Refer to *Table 1A* and enter the left hand end at the package contact width and obtain the allowable weight for the effective package length.
5. If package weight, plus spreader weight, is within this allowable weight, the spreading is adequate – spreader weight is 15 kg/ft³ (see *Table 2 – Effective Length of Spreaders*).
6. If the spreading is not adequate a second layer of spreaders must be used with the bottom layer (in contact with the pallet) preferably running lengthwise along the pallet and the second layer running across the bottom layer (see *Figure 11*).
7. The effective width can now be taken as the package width plus twice the effective spreader overhang for the upper layer of spreaders.

8. Determine the effective package length by adding twice effective spreader overhang for the bottom layer of spreaders to the package length.
9. Refer to *Table 1A* and enter the left hand end at the contact width for the new effective width (as para. 7 above) and obtain the allowable weight for the effective package length.
10. If package weight, plus spreader weight, is within the allowable weight in *Table 1A* the spreader is adequate.
11. If, in either of the above cases, the spreading is still not adequate, a third layer may be used. The third layer would then be laid in the same direction as the bottom layer. Use the same technique of establishing the effective package dimensions by adding twice the effective spreader length to previous effective package length (see *Figure 12*).
12. As far as aircraft structural loading is concerned, it is not essential for the bottom layer of spreaders to be laid side by side and spacing up to 24" is allowable. However, to ease the handling of units on ground and aircraft conveyor systems, and to prolong pallet life, it is preferable for the bottom layer to be side by side or nearly so. The other layers should be spaced at 24" to save fuel and timer costs.

Spreading With Three Layers

Figure 10

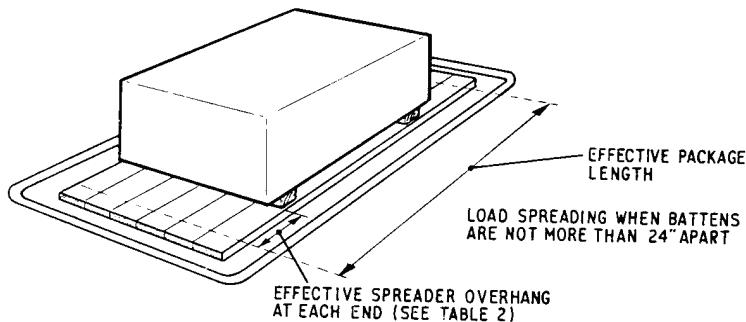


Figure 11

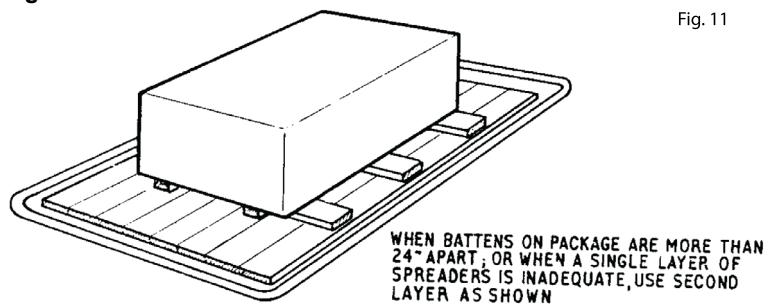


Fig. 11

Figure 12

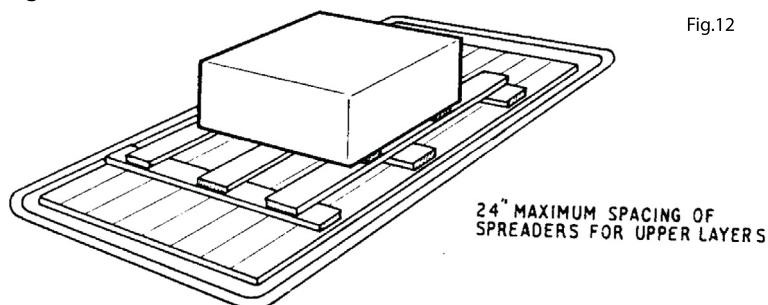
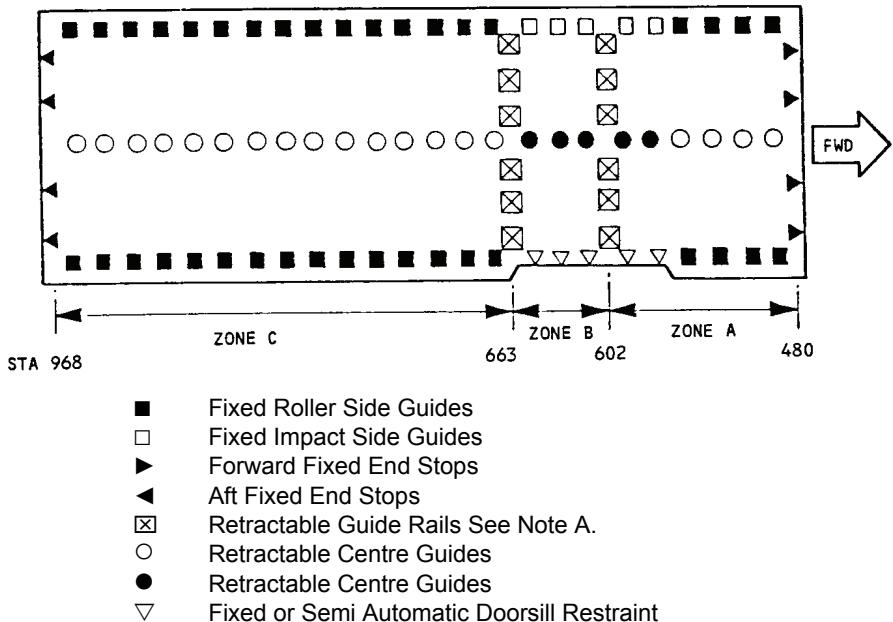


Fig.12

2.5.3 Allowable Loads for Missing or Inoperative Pallet/Container Restraints

2.5.3.1 Forward Hold (Compartment 1 and 2)

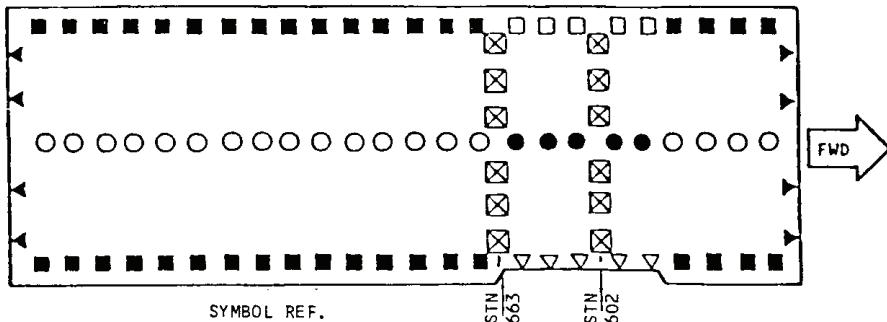


A. Equipment Malfunction Limitations

1. No reduction is necessary in container loads if the roller is jammed or missing in the Fixed Roller Side Guides, Retractable Guide Rails, Retractable Centre Guides or the Door Sill Restraints.
2. No reduction in container loads is necessary if the Ball Units in the Ball Transfer Panel are jammed or missing or the Splitter Rail is inoperative.
3. Where the following items are missing, damaged or the vertical restraint lip is defective, or the functioning mechanism is inoperative in the case of the retractable door restraint or retractable centre guide, the maximum allowable loads of the adjacent container positions must be reduced to that value shown in the appropriate tables in the section.

Report Loading System Defects In Tech Log.

B. Half Width Containers and Full Width Containers Base Size 60.4" x 125"



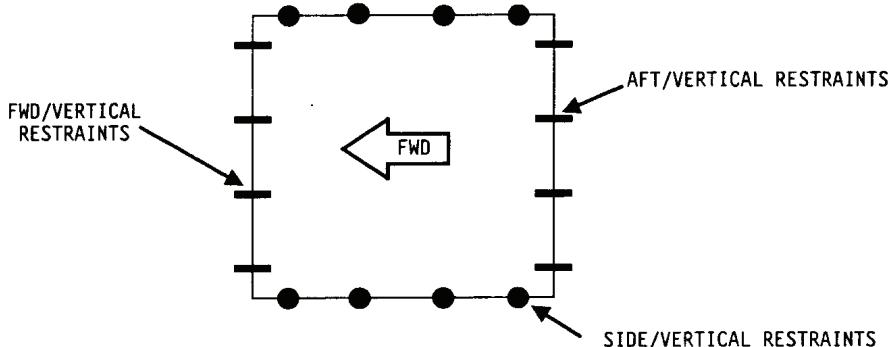
Type Of Restraint	Symbol Ref.	Number of Defective Restraints	Maximum Allowable Load (kg)	
			Per Half Width Container (K)	Per Full Width Container (L)
All Restraints Operative			1588	3175
Side Guides	■ □	1	1588	2159
Side Guides Vertical Lips	■	1	1588	2667
Retractable Door Sill Restraint	▽	1	1588	2417
Retractable Door Sill Restraint Vertical Lip	▽ □	1	1588	2417
Retractable Centre Guide	○	1	1065	
Retractable Centre Guide Vertical Lip	○	1	1588	
Retractable Centre Guide (Door Way)	●	1	1065	
Retractable Centre Guide Vertical Lip (Door)	●	1	1065	

Note: Missing or inoperative restraints must **not** be adjacent to each other nor must there be more than two missing or inoperative restraints in any restraint direction.

Report Loading System Defects In Tech Log.

C. Pallets and Igloos Base Size 88" x 125" (Forward + Aft Holds)

1. 88 x 125 Pallet Restraint System



Basic Pallet Lock Restraint Configuration

Number of Defective Restraints	Allowable Load Per Pallet/Igloo (kg)		
	Vertical ● —	Side ● (B)	Fwd/Aft – (B)
All Restraints Operable	4626 (C)	4626 (C)	4626 (C)
1	4626	3719	4218
2 (A)	4626	2494	2812

- Note:**
- A. Missing or inoperative restraints must not be adjacent to each other.
 - B. A missing forward/aft or side restraint is also a loss of a vertical restraint.
 - C. For qualified load in excess of 4626 kg, at positions – 23P and/or 31P only, see [2.2.1](#) and [2.2.3](#).

Note: Load in excess of 4626 kg require **all** restraints operable.

Report loading system defects in Tech Log.



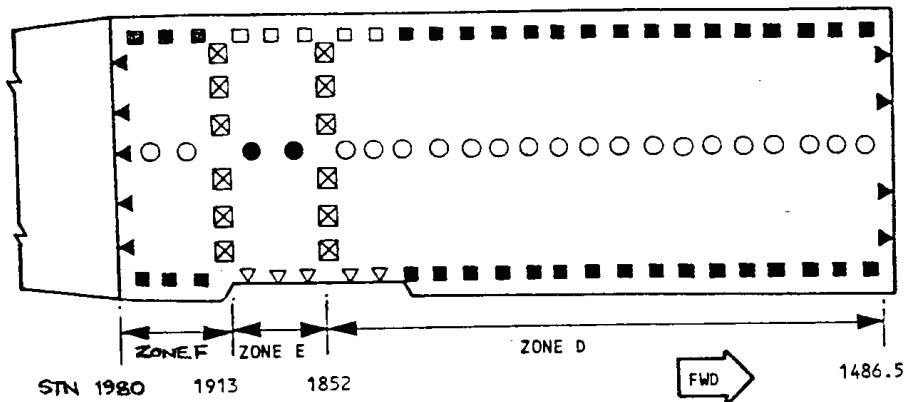
Type Of Restraint	Symbol Ref	Number of Defective Restraints	Total Load Allowable Aft of Restraints (kg)	
			Each Side of Aircraft Half Width Containers (K)	Full Width Containers (L)
All Four Forward Fixed End Stops Operable			4762	9525
Forward Fixed End Stops (STN 480) (B)	▶	1 on one side of aircraft	2381 (A)	4762
		1 each side of aircraft	2381	3969

Type of Restraint	Symbol Ref	Number of Defective Restraints	Total Load Allowable Fwd of Restraints (kg)	
			Each Side of Aircraft Half Width Containers	Full Width Containers
All Four Aft Fixed End Stops Operable			9525	19050
Aft Fixed End Stops (B) (STN 968)	◀	1 on one side of aircraft	4536 (A)	9072
		1 each side of aircraft	4536	7561

Type of Restraint	Symbol Ref	Number of Defective Restraints	Total Load Allowable (kg)			
			Half Width Containers		Full Width Containers	
			Fwd of Rest' nt	Aft of Rest' nt	Fwd of Rest' nt	Aft of Rest' nt
All Six Forward Retractable Guide Rails Operable			3175	9525	6350	19050
Fwd Retractable Guide Rails STN 602 (B)	☒	1 on one side of aircraft	3175 (A)	5293 (A)	6350	13231
		1 on each side of aircraft	3175	5293	6350	10582
		2 on one side of aircraft	3175 (A)	3175 (A)	6350	6350
		2 on each side of aircraft	3175	3175	5293	5293
All Six Aft Retractable Guide Rails Operable			4762	7937	9525	15875
Aft Retractable Guide Rails STN 663 (B)	☒	1 on one side of aircraft	4762 (A)	5293 (A)	9525	13231
		1 on each side of aircraft	4762	5293	9525	10582
		2 on one side of aircraft	3175 (A)	3175 (A)	6350	6350
		2 on each side of aircraft	3175	3175	5293	5293

Note:

- Missing side only.
- See [2.5.5](#) for full set of inoperative lateral guides.
- Missing or inoperative restraints must **not** be adjacent to each other nor must there be more than two missing or inoperative restraints in any restraint direction.

Report Loading System Defects in Tech Log.**2.5.4 Aft Hold (Compartments 3 and 4)**

- Fixed Roller Side Guides
- Fixed Impact Side Guides
- Forward Fixed End Stops
- ◀ Aft Fixed End Stops
- ☒ Retractable Guide Rails
- Retractable Centre Guides
- Retractable Centre Guides
- ▽ Fixed or Semi Automatic Doorsill Restraint

A. Equipment Malfunction Limitations

1. No reduction is necessary in container loads if the roller is jammed or missing in the Fixed Roller Side Guides, Retractable Guide Rails, Retractable Centre Guides or the Door Sill Restraints.
2. No reduction in container loads is necessary if the Ball Units in the Ball Transfer Panel are jammed or missing or the Splitter Rail is inoperative.
3. Where the following items are missing, damaged or the vertical restraint lip is defective, or the functioning mechanism is inoperative in the case of the retractable door restraint or retractable centre guide, the maximum allowable loads of the adjacent container/pallet positions must be reduced to that value shown in the appropriate tables in this section.

Report Loading System Defects In Tech Log.

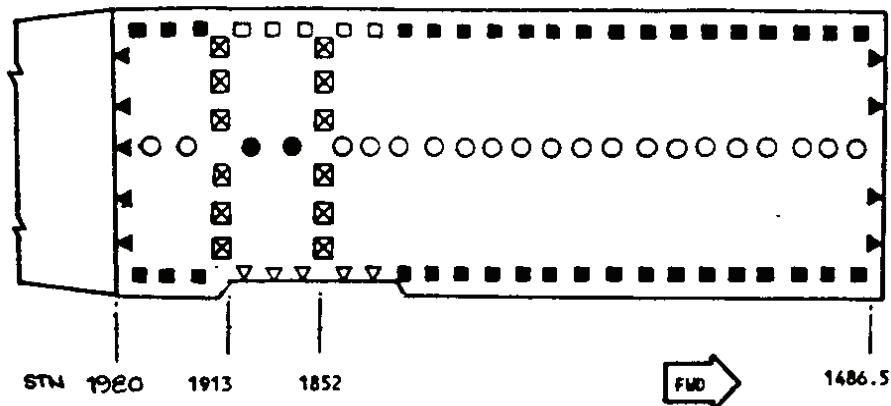


B. Half Width Containers and Full Width Containers Base Size 60.4" x 125"

Type of Restraint	Symbol Ref.	Number of Defective Restraints	Maximum Allowable Load per Unit (kg)	
			Half Width Container (K)	Full Width Container (L)
All Restraints Operative			1588	3175
Side Guides	■	1	1588	2345
Side Guides Vertical Lips	■	1	1588	2667
Side Guides	□	1	1588	2667
Side Guides Vertical Lips	□	1	1588	2667
Retractable Door Sill Restraint	▽	1	1588	1905
Retractable Door Sill Restraint Vertical Lip	▽	1	1588	2780
Retractable Centre Guides	○	1	1156	
Retractable Centre Guides Vertical Lip	○	1	1588	
Retractable Centre Guides	●	1	975	
Retractable Centre Guides Vertical Lips	●	1	975	

Note: Missing or inoperative restraints must NOT be adjacent to each other nor must there be more than two missing or inoperative restraints in any restraint direction.

Report Loading System Defects in Tech Log.



Type Of Restraint	Symbol Ref.	Number of Defective Restraints	Total Load Allowable Aft of Restraints (kg)	
			Each Side of Aircraft Half Width Containers (K)	Full Width Containers (L)
All Four Forward Fixed End Stops Operable			11,113	22,226
Forward Fixed End Stops (STN 1486.5) (E)	▶	1 on one side of aircraft	4536 (A)	9072
		1 on each side of aircraft	4536	7561

Type of Restraint	Symbol Ref.	Number of Defective Restraints	Total Load Allowable Forward of Restraints (kg)	
			Each Side of Aircraft Half Width Containers	Full Width Containers
All Four Forward Fixed End Stops Operable			11,113	22,226
Forward Stops (D) (STN 1980) (E)	◀	1 on one side of aircraft	4990 (A)	9979
		1 on each side of aircraft	4990	8323



Type of Restraint	Symbol Ref.	Number of Defective Restraints	Total Load Allowable (kg)			
			Half Width Containers (K)		Full Width Containers (L)	
			Fwd of Rstnt	Aft of Rstnt	Fwd of Rstnt	Aft of Rstnt
All Six Retractable Guide Rails Operable STA 1582			9525	3175	19,050	6350
Retractable Guide Rails STA 1852 (D)	<input checked="" type="checkbox"/>	1 on one side of aircraft	9525 (A)	3175 (A)	19,050	6350
		1 on each side of aircraft	9525	3175	19,050	6350
		2 on one side	5624 (A)	3175 (A)	11249	6350
		2 on each side	5624	3175	9525	6350
All Six Retractable Guide Rails Operable STA 1913			9525	1588	19,050	3175
Retractable Guide Rails STA 1913 (D)	<input checked="" type="checkbox"/>	1 on one side of aircraft	9525 (A)	1588 (A)	19,050	3175
		1 on each side of aircraft	9525	1588	19,050	3175
		2 on one side	5624 (A)	1588 (A)	9525	3175
		2 on each side	5624	1588	9525	3175

Notes: A. Missing side only.

- B. Missing or inoperative restraints must not be adjacent to each other nor must there be more than two missing or inoperative restraints in any restraint direction.
- C. A fifth aft end stop located at the aircraft centre line is utilised as a lateral guide during loading/unloading operations.
- D. See [2.5.5](#) for full set of inoperative lateral guides.

Report Loading System Defect in Tech. Log.

2.5.5 Allowable Loads for Inoperative Lateral Guide Rail Sets Malfunctions – Half Width (K-base) and Full Width (L-base) Containers Base Size 60.4"×125"

General Rules:

Dependant on ULD configuration(s):

A set of lateral guides consists of 6 guides at a single station. The 3 guides on the left and right of the compartment provide forward and aft restraint for K-base units. All 6 guides provide forward and aft restraint for L-base units.

Note: Guide Rails have no vertical restraint capabilities.

With a Malfunction of the Lateral Guide Rail Set (S) Powered Operation

Condition 1:

(Usual Guide Rail Set condition with a powered operation malfunction)

Individual Guide rails are typically spring loaded in the extended (UP) position.

With fully extended guide rails in the (UP) position:

- Forward and aft restraint capabilities for K and L Base Containers, is maintained and assured.
- Normal stated Container restraint load limits apply.

Operation of the Guide Rails in this condition, may be accomplished manually, i.e. foot operated. See Caution note below.

**Condition 2:**

Individual Guide Rails are failed in the retracted (DOWN) position.

For individual guide rails in the retracted (DOWN) position, please refer to Loading Section 2.5.3 and Loading Section 2.5.4 for the applicable loading limitation for one or more restraints inoperative.

With all guide rails required (3 guides on the left or right side for K-base units or 6 guides for L-Base units) in the retracted (DOWN) position.

- **No** loads that require Lateral Guide Rail Set, Forward or Aft restraint are permitted.
- Other compartment restraint components that remain fully operational, may be utilised within their individual load restraint capabilities.

CAUTION: *Manual (foot operated) Operation of Individual Lateral Guide Rails is possible.*

With manual operation:

- Each Lateral Guide rail may be retracted and locked down using its hold down clip.
- Releasing the hold down clip, should allow Guide Rail to fully extend, UP.
- AMM 25-53-00 refers.
- Permits continued ULD load/unload operations.

Malfunctions of Lateral Guide Rail (s) and/or, missing or unusable hold down clips shall be reported to A/C Maintenance Eng.



2.5.6 Allowable Loads for Restraint of Half Width and Full Width Containers with Container Stops or Pallet Locks

A. Container Stops

	No. of Restraints	Total Load Allowable (kg)
Half Width Container (each side of aircraft)	2 Stop	6350
	1 Stop	3175
Full Width Container	4 Stops	12700
	3 Stops	6350
	2 Stops (1 each side of aircraft)	5293

B. Pallet Locks

	No. of Restraints	Total Load Allowable (kg)
Half Width Container (each side of aircraft)	2 Pallet Locks	3175
	1 Pallet Lock	1587
Full Width Container	4 Pallet Locks	6350
	3 Pallet Locks	3175
	2 Pallet Locks (1 each side of aircraft)	2644

Report Loading System Defects In Tech. Log.

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SECTION 3 SPECIAL LOADING INSTRUCTIONS

3.1 Loading Instructions

3.1.1 General

To comply with the Appropriate Article of the Air Navigation Order, the person responsible for the trim of the aircraft must give written instructions to the person responsible for the physical loading. For this purpose, a Loading Instruction and Report Form is used.

Written instructions must also be given when load is to be moved to adjust trim. This applies whether uplift or discharge of load is involved or not.

Loading and Loadsheets activities are not complete and the aircraft not clear to leave until the ground operations official responsible for the departure is satisfied that the Loadsheets (aircraft and ground copies) and Loading Instructions/Report show the same loads. The exception to this is when Late Closeout procedures apply.

3.1.2 Load Planning

RCCAs are issued by commercial control manager for all operations. These allocate to stations the weight and volume to be used for baggage, cargo and mail. Any queries to LONQRBA.

Note: On multi sector flights stations must consider the needs of en-route stations as well as their own.

With this in mind, the following principles should be followed as far as possible:

- i. Load must never be over stowed by load for another destination. Always follow the 'first on, last off' principle.
- ii. When trimming the aircraft, always consider the trim out of en-route stations. Whenever possible, at the originating station the aircraft should be trimmed so that when load for en-route stations is removed, the aircraft will remain in trim without having to move transit load even if there is no joining load.
- iii. The effect of reduced trim limits resulting from the use of tail tank fuel and low S.G. fuel must also be considered.
- iv. Do not mix different categories of load in the same container.



3.1.3 Loading Instruction Report Forms

For example LIRFs see BA Intranet:

BA Intranet/Flight Operations Home/Flight Technical Services/Aircraft Weights and Evaluation

These are combined load distribution, planning and loading instructions documents.

A. Distribution

The number of copies prepared for each flight are at the discretion of the local airport manager.

However, at least one form must be prepared by the Load Planner for the Loading Supervisor. After any necessary amendments, and on completion of loading, the form must be signed by the Loading Supervisor and returned to the Load Planner, to be kept with the flight documentation for the statutory time in the departure airport file.

Additional procedures apply where Centralised Load Control is operated.

B. Completion

Detailed completion instructions are contained in Ground Operations Manual [5.6.2](#).

1. Container Compartments 1, 2, 3 and 4

The ULD destination/contents/weight (see para 5). Include the volume remaining code where applicable for the Report section.

2. Bulk Compartment 5

- a. Discharge Station in 3 letter code.
- b. Contents Cargo, Mail or Bags using the approved code.
- c. Total Weight (Number of pieces for passengers' baggage).
- d. Tie Down Instructions for Class 2 items of load. Livestock, special stowage etc. should be entered in the "Special Instruction" box.

3.1.4 Container/Pallet Distribution Message

After aircraft loading is complete, the Loading Supervisor will return the Loading Instructions and Report amended as necessary, to Load Planning. Load Planning will complete the Report section of the LIRF as necessary to show the final load distribution of the aircraft. This will be used to prepare the Container/Pallet Message (CPM), as detailed in Ground Operations Manual [5.8.1](#). The CPM will be given the same signal priority as the Load Message.

3.1.5 ULD/Bulk Load Weight Statement

These forms are used in conjunction with the Loading Instruction/Report form and have a similar legal standing.

Persons signing these weight statements have numerous responsibilities. The documents are further used however as a means of transmitting ULD and Bulk load data by flight, from the Cargo area to the load planning section, in order that an accurate Loading Instruction/Report Form can be prepared.

For example LIRF see BA Intranet:

BA Intranet/Flight Operations Home/Flight Technical Services/Aircraft Weights and Evaluation



B747 Load and Balance

**British
airways
cargo**

ULD/bulk load weight statement

All weights in kilos

This form must be sent to Load Control by the quickest means.

L.D. = lower deck

Tanzia

LB = Lower dec
MB = Main body

Bulk load

X191/A5067(2nd)

3.2 Stowage and Documentation Instruction – Dangerous Goods

3.2.1 Introduction

British Airways holds a written approval from the United Kingdom Civil Aviation Authority to transport dangerous goods by air in accordance with the International Civil Aviation Organisation's Technical Instructions For The Safe Transport Of Dangerous Goods By Air.

Both Domestic and International legislation requires that the carriage of dangerous goods must fully comply with provisions of the current ICAO Technical Instructions. These provisions are reflected in the current edition of the IATA Dangerous Goods Regulations which British Airways uses as a working manual.

Handling and loading information is contained in section 9 of the IATA Dangerous Goods Regulations.

3.2.2 Restraint of Dangerous Goods

Dangerous goods must be loaded and secured in such a manner that will prevent any movement. This can be achieved, by means of individual restraint by use of straps, rope, etc. Where securing of individual DG packages cannot be achieved effectively, consideration should be given to positioning the DG in a larger consignment of general cargo to improve stability and protect against movement. If this approach is adopted, it is important that DG consignments are positioned on the outside of the larger consignment with the DG markings and labels clearly visible.

Spillable batteries containing acids must be restrained by the use of straps, rope, etc. Securing by other baggage or cargo is not permitted.

3.2.3 Additional US Requirement

When carriage of dangerous goods is FROM, TO or WITHIN the USA, the following additional US Department of Transportation regulations apply.

The total net quantity of dangerous goods is limited to 25 kg per inaccessible hold in addition to a limit of 75 kg net weight per inaccessible hold of non-flammable, non-toxic gases (RNG and RCL).

Note 1: The above limits exclude the following categories:

- Class 9 only. Standard aircraft and hold limitations apply for Class 9 including Magnetised Material (MAG), Miscellaneous Dangerous Goods (RMD), Dry Ice (ICE), Consumer Commodity – ORM-D, etc.

Note 2: For the purpose of the carriage of dangerous goods FROM, TO or WITHIN the USA there are TWO holds on the B747:

Forward HOLD Compartments 1 and 2.

Aft HOLD Compartments 3, 4 and 5.



Dangerous Goods (Ref: 1-10)

Ref No	Class	Item	Code	Compartment	Limitations	Notes	Entry Required	
							NTC	LDM
1	1.4S	Explosives	RXS	Any		Explosives of classes other than 1.4S are NOT acceptable for carriage in passenger aircraft.	Yes	Yes
2	2.1	Flammable gas	RFG	Any			Yes	Yes
3	2.2	Non-flammable, non-toxic gas	RNG	Any			Yes	Yes
4	2.2	Refridgerated liquid gas	RCL	4	50 kg	Not in same HOLD as live animals or hatching eggs.	Yes	Yes
5	3	Flamable liquid	RFL	Any		Not adjacent to class 5.1 (ROX).	Yes	Yes
6	4.1	Flammable solid	RFS	Any			Yes	Yes
7	4.2	Spontaneously combustible	RSC	Any		Not adjacent to class 5.1 (ROX).	Yes	Yes
8	4.3	Water reactive material (dangerous when wet)	RFW	Any		Not adjacent to class 8 (RCM).	Yes	Yes
9	5.1	Oxidising material	ROX	Any		Not adjacent to class 3 and class 4.2 (RFL, RSC).	Yes	Yes
10	5.2	Organic peroxide	ROP	Any			Yes	Yes

Dangerous Goods (Ref: 11-13)

Ref No	Class	Item	Code	Compartment	Limitations	Notes	Entry Required	
							NTC	LDM
11	6.1	Toxic Poison	RPB	Any		a. Not in the same CPT as, or adjacent to foodstuffs. b. Not in the same CPT as, or adjacent to live animals. c. Not in the same CPT as, or adjacent to hold loaded catering equipment. d. Except where: <ul style="list-style-type: none">• The dangerous goods are loaded in one closed unit load device and the foodstuffs or animals are loaded in another closed unit load device or,• Where open unit load devices are used, the ULDs must not be stowed adjacent to each other.	Yes	Yes
12	6.2	Infectious Substances	RIS	Any		a. Not in CPT 4 if AVI in 5. b. Not in CPT 3 or 5 if AVI in 4. c. Not in CPT 1 or 2 if AVI in 1 or 2. d. Not in the same CPT as foodstuffs or hold loaded catering equipment.	Yes	Yes
13	6.2	Biological Substances Category B	RDS	Any		Note: The above restrictions do not apply when RIS, AVI, foodstuffs and hold loaded catering equipment are in separate closed ULDs.	No	Yes

RRY Chart

Dangerous Goods (Ref: 14-18)

Ref No	Class	Item	Code	Compartment	Limitations	Notes	Entry Required	
							NTC	LDM
14	7	Radioactive Category I	RRW	Any		Not permitted		
15	7	Radioactive Category II and III	RRY	Any		Not permitted		
16	8	Corrosive	RCM	Any		Not adjacent to Class 4.3, (RPW)	Yes	Yes
17	9	Miscellaneous Dangerous Goods	RMD	Any			Yes	Yes
18	9	Magnetised Material	MAG	Any		a. Load in random fashion i.e. front to rear, top to bottom. This assists in cancelling out the magnetic fields generated by each package. b. Metals (ferrous and non -ferrous) such as car parts, metal fencing, piping and metal construction materials may effect aircraft instruments - hence are subject to the same limitations.	No	Yes

Dangerous Goods (Ref: 19-21)

Ref No	Class	Item	Code	Compartment	Limitations	Notes	Entry Required	
							NTC	LDM
19	9	Dry Ice	ICE	CPT 1 and 2 Combined Compartment 3, 4 and 5 Combined	530 kg 600 kg	a. Ventilate HOLD before entering to unload. b. No ICE in same hold as AVI/HEG, subject to exception in Note 3. c. When AVI/HEG are carried in CPT 5 and/or CPT 4, up to 50 kg of ICE may be carried in CPT 3 provided a minimum of 2 metres from AVI/HEG.	Yes	Yes
20		Cargo Aircraft Only Items	CAO	Not Permitted				
21	9	Lithium (Metal) Battery	RLM	Any	None	a. UN3090 Lithium Metal batteries are prohibited on passenger carrying aircraft. b. UN 3091 Lithium Metal Batteries 'packed with equipment' or 'contained in equipment' are permitted.	N/A Yes	N/A Yes

Dangerous Goods (Ref: 22-23)

Ref No	Class	Item	Code	Compartment	Limitations	Notes	Entry Required	
							NTC	LDM
22	9	Lithium (Ion) Battery	RLI	Any	None	a. UN3480 Lithium Ion batteries are prohibited on passenger carrying aircraft. b. UN 3481 Lithium Ion Batteries 'packed with equipment' or 'contained in equipment' are permitted.	N/A Yes	N/A Yes
23	9	Lithium (Metal) Battery	ELM	Any	None	a. UN3090 Lithium Metal batteries are prohibited on passenger carrying aircraft. b. UN 3091 Lithium Metal Batteries 'packed with equipment' or 'contained in equipment' are permitted.	N/A No	N/A Yes



Dangerous Goods (Ref: 24)

Ref No	Class	Item	Code	Compartment	Limitations	Notes	Entry Required	
							NTC	LDM
24	9	Lithium (Ion) Battery	ELI	Any	None	a. UN3480 Lithium Ion batteries are prohibited on passenger carrying aircraft. b. UN 3481 Lithium Ion Batteries 'packed with equipment' or 'contained in equipment' are permitted.	N/A No	N/A Yes
25	9	Polymeric Beads	RSB	Any	100 kg		Yes	Yes

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3.2.4 Reporting of Damage and Spillage of Restricted Articles

Damaged Packages – Safety Precautions (refer to Dangerous Goods Manual)



3.3 Stowage and Documentation Instructions – Live Animals

3.3.1 General

The welfare of animals in aircraft is the subject of UK Government legislation. The relevant order is ‘The Transit of Animals (General) Order 1973’. Under this order it is the duty of every person responsible for loading or unloading animals, to ensure that they are not and will not be caused injury or unnecessary suffering, due to the use of inadequate containers, improper stowage, exposure to weather, lack of fresh air, exposure to undue fluctuations of temperature, humidity or air pressure, or undue noise or vibration.

The following manuals are available for reference:

- IATA Live Animals Regulations.
- Customer Service Manual A8 – “Assistance Dogs In The Cabin”.
- Customer Service Manual B 10 – “Pets as Baggage”.
- Cargo Standard Operating Procedure M03 – “Live Animals”.

Live animals must travel as cargo on all British Airways flights, apart from the exceptions listed below, where carriage as baggage or carriage in the cabin is permitted.

3.3.2 Exceptions for Carriage of Live Animals as Baggage

3.3.2.1 Carriage of Guide Dogs, Assistance Dogs and Search and Rescue Dogs in the Cabin

In order to ensure compliance with the U.S. Carrier Access Act, British Airways allow guide dogs, assistance dogs and search and rescue dogs to travel on longhaul and shorthaul flights in the cabin of an aircraft when accompanied by either an owner who is blind, deaf or disabled or a dog trainer.

Dogs are not permitted on the upper deck of a Boeing 747 or in an over wing/emergency exit row of any aircraft.

In Club World or First the passenger will be pre-assigned one seat. In all other classes: where possible, the passenger will be pre-assigned one seat and the seat adjacent (window) will be blocked off for the assistance dog.



Note: For Guide Dogs, Assistance Dogs and Search and Rescue Dogs carried in the cabin, the three-letter code "AVG" is used instead of "AVI" or "PET".

3.3.3 Advice on Carriage of Animals

Document	Requirement	
Loading Instruction and Report Form	AVI/PET:	State type of animal and any special instructions for loading staff in "Special Instruction" box.
	AVG:	Nil.
Special Load Notification Form	AVI, AVG or PET:	Entry is always required.
Load Message	AVI, AVG or PET:	Entry is always required in Remarks field.

3.3.4 Feeding and Watering

Most animals will require watering, but for feeding, documents should be checked for any specific instructions from the shipper. Food where supplied will be attached to the container.

Note 1: No live bait to be supplied as food.

Note 2: No 'tit bits' to be given to animals.

Note 3: The seals of 'sealed' containers must not be broken or tampered with.

3.3.5 Exercise and Escape

Exercise may be necessary, within restricted areas during delays – if local regulations permit.

Care must be taken to prevent escape, but in the event of this happening police and local authorities must be told immediately.

3.3.6 Loading of Animals on Aircraft – General Rules

- A. Load or unload as near as possible to aircraft departure or arrival.
- B. In warm weather when a large consignment of animals is being carried, leave the hold door open until the aircraft is about to depart.
- C. In cases of delay, do not leave animals on apron or in aircraft hold unnecessarily.



- D. Place animals containers on continuous polythene sheeting (500 gauge) of sufficient size to extend beyond the base of the container to protect the hold floor from excreta and liquid spillage.
- E. Stow livestock containers on aircraft shelves or on spreaders at least 2 in (5 cm) off the hold floor.
- F. Containers must be kept upright and level when being loaded or unloaded.
- G. Stow container upright and restrain them to prevent injury to the animals and damage to the aircraft.
- H. Air must be able to circulate freely around each container, ventilation holes and grilles must not be blocked. Other loads in the hold, particularly PO mail, should be secured to prevent accidental damage to adjacent animal containers or impeding the air circulating around them.
- I. Ensure there is a gap of at least 6 in (15 cm) between the top of the container and hold ceiling to allow airflow across the top of the container.
- J. Do not load live animals in the same compartment as, foodstuffs, poisons or infectious substances unless each is stowed in a separate closed ULD.
- K. Do not load live animals or hatching eggs in the same hold as cryogenic liquids (e.g. Liquid Nitrogen).
- L. When loading live animals or hatching eggs in the same compartment as ICE refer to the Dangerous Goods Manual.
- M. Do not load 'Natural Enemies' adjacent to each other unless they come from the same household.
- N. Animals and hatching eggs must be separated from consignments of Radioactive Category II and III yellow labels by a minimum of 1 ft 8 in (0.5 m).
- O. Animals, with the exception of fish in sealed plastic containers, must not be stowed in enclosed ULDs.
- P. Quarantine animals must not be loaded in the same hold as non-quarantine animals, on UK Domestic Sectors.

3.3.7

Loading of Animals (Boeing 747-436 Rules)

- A. These aircraft limitations may be exceeded with prior permission of Ground Services Technical Support (LHRGGBA) or cargo Industry Standards (LHRCNBA).

- B. If the aft cargo heating system is inoperative, live animals must not be carried in compartments 3,4 or 5. If the bulk cargo heater is inoperative, live animals must not be carried in compartment 5.
- C. Cargo heat temperature selections are made by a switch adjacent to the main cargo door for compartments 3 and 4 and adjacent to the bulk cargo door for compartment 5. When livestock is carried the appropriate switch must be set to 18°C.
- D. Quantities specified and species not covered in this chapter may be carried under a special authority from Cargo Industry Affairs – LHRCNBA.
- E. If a pallet of AVI is loaded in compartment 4, it should be stowed as close as possible to H5 to achieve maximum air circulation. Refer to Dangerous Goods Manual for reference to ICE.

3.3.8 Loading of Animals – Animals Permitted on B747-436

Item	CPT	Limitations	Special Requirements
A Birds – 72 hr Poultry (Day Old Chicks)	5 4 2	5000 Birds 12,000 Birds 12,000 Birds	Restrict other load in compartment to provide maximum ventilation.
B Birds – 72 hr Poultry	5	1.7 cu m (60 cu ft)	AVI may be carried on pallets in compartments 2 and 4 with prior approval as per 05-03-04 para 7A.
C Domestic Cats and Dogs	5	2.8 cu m (100 cu ft)	
D Assistance Dogs, Guide Dogs, Search and Rescue Dogs	Cabin	N/A	<ol style="list-style-type: none"> 1. Passenger Seat allocation: <ol style="list-style-type: none"> a. First/Club World: one seat for pax. b. Other classes: one seat for pax and (where possible)adjacent seat blocked for dog. 2. Documentation Procedures: <ol style="list-style-type: none"> a. LIRF – Nil. b. Special Load Notification Form – show AVG in cabin. c. Manual Loadsheet – show actual weight as cabin baggage. d. Balance Chart: <ol style="list-style-type: none"> i. 30 kg or less – Nil. ii. More than 30 kg – convert to EQ PAX in appropriate cabin area. e. Loadmessage – AVG in remarks.
E Fish – Tropical	3, 4 and 5		
F Fish – Cold Water and Shell	Any		
G Bees,	1 and 2 3 and 4	3000 kg gross weight per hold	Combined weight in compartments 3, and 5 must not exceed 3000 kg.
	5	1000 kg gross weight	
Other Insects	5	1000 kg gross weight	
H Reptiles	5	1.7 cu m (60 cu ft)	
I Monkeys	5	200 monkeys or 500 kg body weight whichever is more restrictive.	Only acceptable with prior approval traveling for two reasons: 1. Zoo transfer. 2. Conservation, including breeding purposes. Any AVI for laboratory use are NOT accepted for travel on BA.
J Rodents	5	140 cu ft (4 cu m) or 180 kg body weight	
K Small Fur Bearing Animals	5	140 cu ft (4 cu m) or 180 kg body weight	May be carried on pallets in compartments 2 and 4 with prior approval.
L For the carriage of larger animals additional permission is required from the Live Animal Product Manager. Email: cargoproducts@ba.com .			

3.4 Stowage and Documentation Instructions – Special Deadload

3.4.1 Non-revenue Items

Stowage Details		Documentation Procedures			LDM	Notes
	Ldg Inst/Report	Loadsheet	Balance Chart			
1	Non-revenue Items					
A.	Flight Document Container Care of Senior Cabin Crew member	–	–	–		
B.	Airway Bill Container CPT 5 Section 52	–	–	–		
C.	OCS Mail CPT 5 Section 52	–	–	–	COM	Standard instruction: GOM 3.3.4. Must bear a label or tag with IATA 3 letter destination code.
D.	Crew Baggage					
1.	Longhaul (All bags)	–	Included in "CREW" weights. See 01-03.	Included in "CREW" index. See 01-03.		
2.	Shorthaul:		Included in "CREW" weights. See 01-03.	Included in "CREW" index. See 01-03.		
a.	Cabin baggage – in cabin care of crew.	–	Adjust loadsheet accordingly. See 01-03.	Adjust balance accordingly. See 01-03.		Identified by means of special labels.
b.	Hold baggage – load in appropriate hold.	–				Load in Cpt 5 (Section 51).

3.4.2 Specially Authorised Cabin Loaded Baggage

Stowage Details		Documentation Procedures			LDM	Notes
	Ldg Inst/report	Loadsheet	Balance Chart			
2	Specially Authorised Cabin Loaded Baggage					
A.	Cello/s See OM B 2.3.3.		For non-FLY stations ONLY: Show actual weight as Baggage in CPT 0.	30 kg or less – nil. More than 30 kg convert to EQUIVALENT PASSENGERS in Cabin Area.	SOC	a. For non-FLY stations: SOC. b. For FLY stations, this is represented as CBBG.
B.	Works of Art Load on or at seats at rear of cabin.	CPT O: Enter "ROW..... PICTURE(S) kg".	For non-FLY stations ONLY: Show actual weight as Baggage in CPT O.	30 kg or less – nil. More than 30 kg – convert to EQUIVALENT PASSENGERS in Cabin Area.	SOC	Passenger seats unusable – 1 (or 2). Accompanying passenger to occupy adjacent seat. Do not use Emergency Exit rows.
C.	Other Items Load on seats at rear of cabin.	CPT O: Enter: "ROW..... (DESCRIPTION)kg".	For non-FLY stations ONLY: Show actual weight in Baggage in CPT O.	30 kg or less – nil. More than 30 kg – convert to EQUIVALENT PASSENGERS in Cabin Area.	SOC	Passenger seats unusable – 1 (or 2). Accompanying passenger to occupy adjacent seat. Do not use Emergency Exit rows.

3.4.3 Diplomatic Mail

Stowage Details		Documentation Procedures			LDM	Notes
	Ldg Inst/report	Loadsheet	Balance Chart			
3	Diplomatic Mail			–		
	A. Queen's Messenger Accompanied Diplomatic Mail – 10 kg or less Under seat occupied by QM.		Show actual weight in Baggage in CPT O.			Standard Instruction GOM 5.6.1.4 .
	B. Queen's Messenger Accompanied Diplomatic Mail – More than 10 kg 1. Using Fabric Containers Normally Seat 1A (and 1B)	CPT O: Enter SEAT 1A (and 1B) – QM DIPKG.	Show actual weight in Baggage in CPT O.	30 kg or less - nil. More than 30 kg - convert to EQUIVALENT PASSENGERS in Cabin OA.	SOC	Standard Instruction GOM 5.6.1.4 1. Max Volume 13½ cu.ft./seat 2. Pax seats unusable - 1 (or 2). 3. QM to occupy seat adjacent to mail. 4. SOC entry showing number of seats used.
	2. Queen's Messenger Compartment Forward wardrobe First Class cabin.	CPT 0: Enter QM Stowage – QM DIP... KG.	Show actual weight as BAGGAGE IN cpt 0.			1. Max weight 40 kg. 2. Max volume 8.3 cu ft.
	C. British Airways Security Accompanied Diplomatic Mail 1. Using Box Type 1 CPT 5 on western routes. Rummage Container on southern and eastern routes.	Enter in appropriate CPT or position wt of contents. Enter weight of container as EIC.	Show weight of contents as mail. Show weight of container as cargo. Enter EIC/...(CPT) ... (weight) in Destination Remarks box.	Normal	SEC	Max weight of box and contents – 50 kg.
	2. Using Box Type 2 CPT 5 on western routes. Rummage Container on southern and eastern routes.	Enter in appropriate CPT or position weight of contents. Enter weight of container as EIC.	Show weight of contents as mail. Show weight of container as cargo. Enter EIC/...(CPT) ... (weight) in Destination Remarks box.	Normal	SEC	Max weight of box and contents – 1000 kg.
	D. Unaccompanied Diplomatic Mail In security locker, care of a senior cabin crew member.	–	Include as mail in CPT 0.	–	DIP	1. Located under the stairs at door 2L. 2. Max weight 20 kg. 3. Max volume 3.2 cu ft. 4. Standard instruction: <ul style="list-style-type: none">• Cargo SOPs M04.



3.4.4 Checked Baggage

		Documentation Procedures					
Stowage Details		Ldg Inst/report	Loadsheet	Balance Chart	LDM	Notes	
4	Checked Baggage						
	A. Checked Bags of More than 25 kg each						
	1. If allowing for them at the standard then any CPT.	Normal	Normal	Normal	–	Standard Instruction GOM 5.6.1.3.	I
	2. If using actual Weight for these pieces, then any CPT.	Enter actual weight for these in appropriate CPTs.	Include these pieces at actual weight in baggage totals.	Normal	–		
	B. Battery Driven Wheelchairs and Other Mobility Aids as Checked Baggage						
	1. Wet Cell Batteries.	Normal	Normal	Normal	–	1. Refer to Corporate Dangerous Goods Manual Ch 4 for further information. 2. When carried in ULDs: <ul style="list-style-type: none">• Must be stowed in an upright position and secured at all times.• Battery must be securely attached to wheelchair/mobility aid.• Battery terminals must be disconnected and taped to prevent short circuiting.• Caps must be securely fitted.	

Stowage Details	Documentation Procedures				LDM	Notes
	Ldg Inst/report	Loadsheet	Balance Chart			
Battery Driven Wheelchairs and Other Mobility Aids as Checked Baggage (continued)						
1. Wet Cell Batteries (continued)	Normal	Normal	Normal	–	–	<ul style="list-style-type: none"> 3. When loaded in CPT 5 and cannot be stowed/secured in an upright position: <ul style="list-style-type: none"> • Battery must be removed from wheelchair/mobility aid and carried as checked baggage. • The battery must be protected against short circuits and packed in strong, rigid, leak proof packaging which is impervious to battery fluid and surrounded by compatible absorbent material sufficient to absorb the total liquid contents. • The packaging must be marked 'Battery Wet with Wheelchair' and marked with a 'Corrosive' (class 8) and orientation labels. • The packaging must be protected from movement during flight by individually restraining the packages with straps, ropes, etc. • The Captain of the aircraft must be informed of the position of the wheelchair/mobility aid containing a spillable battery (or the position of the boxed battery) by a NOTOC entry.
Battery Driven Wheelchairs and Other Mobility Aids as Checked Baggage (continued)						
2. Dry Cell or Non-spillable Wet Cell	Normal	Normal	Normal	–	–	<ul style="list-style-type: none"> 1. Battery must be securely attached to the wheelchair/Mobility aid. 2. Wheelchair/Mobility aid must be protected from inadvertent operation by either removing a key or deactivation by joystick or isolation switch/button. 3. Care must be taken during loading/unloading to ensure that joystick/isolation switch cannot be turned on or damaged by adjacent baggage. 4. Only if item 2 above cannot be achieved should disconnection of the battery be considered. Battery terminals should be taped to prevent short circuiting. 5. May be loaded in ULDs or bulk holds and should always be stowed and secured in an upright position and protected from damage/inadvertent operation by other items of baggage. 6. Refer to Corporate Dangerous Goods Manual Ch 4 for further information.

3.4.5 Cabin Loading of Deadload

Stowage Details	Documentation Procedures				LDM	Notes
	Ldg Inst/report	Loadsheet	Balance Chart			
5 Cabin Loading of Deadload Cabin Loading on Seats Not permitted on 747-436 (except special items in 05-04 pages).	–	–	–	–	–	



3.4.6 Security Procedures – Hold Stowage of Security Removed Items

	Stowage Details	Documentation Procedures			LDM	Notes
		Ldg Inst/report	Loadsheet	Balance Chart		
6	Security Procedures – Hold Stowage of Security Removed Items Single Items removed from passengers by security staff – load in plastic bags in any CPT.	CPT ... Enter 'SEC' followed by number of bags.	–	–	SEC	

3.4.7 Deadload Requiring Special Handling

Ref No	Class	Item	Code	Compartment	Limitations	Notes	Entry Required	
							NTC	LDM
7	Deadload Requiring Special Handling			In yellow plastic "Press Bag" in CPT 5.	–		No	No
	A. Press Material, Newsfilms and Small Items of Cargo			Any	–	1. Only load in these CPTs if prior arrangements have been made to use loading vehicles that do not endanger the trailing edge of the wing or engine nacelle at both the departure and destination station. 2. Restraint and Spreading. Instructions – See 03-04 and 03-05.	No	Yes
	B. Items Over 150 kg Each	HEA			–			
	C. Valuable Cargo	VAL	Security Locker or ANY CPT	Any	–	Standard instructions: • Cargo SOPs A05.	Yes	No
	D. Munitions of War	MUW or MWB		ANY	–	1. Standard instruction: • Cargo SOPs A05.	Yes	Yes
	E. Human Remains 1. Ashes 2. In Coffins	- HUM		ANY ANY	–	Do not stow under any other load. 1. Not within 2 ft (0.6 m) of foodstuffs. 2. Stow horizontally (and keep as horizontal as possible during loading/unloading). 3. Do not stow under any other load. 4. If possible stow (with accompanying flowers) in a CPT which contains no other load. 5. Do not lift by the lid or ornamental handles. 6. If possible load and unload out of the sight of passengers.	No Yes	No Yes
	F. Flowers and Plants	PEF	3, 4 and 5			1. Pallets must be fully wrapped in plastic. 2. Do not load directly on to the floor. 3. When stowed in the rear hold, ensure that the appropriate cargoCPT heating switches are set to ON/LOW. 4. Up to 2 ULDs (AK size) can be loaded in CPT 1 if it is not possible to load in CPT 3 or 4.	Yes	Yes
	F Additional Restrictions when Loaded in CPT 2	PEF	2			1. Up to 2 pallets or 4 ULDs (AK size) may be loaded in CPT 2. Pallets and ULDs must be kept in a cool area as near to the time of loading as possible.	Yes	Yes
						Note: In all cases, perishable goods must not be carried in any hold when the holds heating is set at ON/HIGH.		

Ref No	Class	Item	Code	Compartment	Limitations	Notes	Entry Required	
							NTC	LDM
G.	Fresh Meat		PEM	ANY		<ul style="list-style-type: none"> 1. PEM and AVI must be separated by a minimum of 30 cm, 12 inches. 2. Not in same CPT as RPB or RIS unless RPB, RIS and PEM are in separate closed ULDs. <p>Note: In all cases, perishable goods must not be carried in any hold when the holds heating is set at ON/HIGH.</p>	Yes	Yes
H.	Pre-packed Fruit and Vegetables	Pre-packed Fruit and Vegetables. Fruit and Veg pre-packed in ready for 'sale' packages. These packages are then packed in outer boxes. They can be carried in any CPT subject to the restrictions given in this section. Exemptions The items listed below can be carried loose and still designated as PEP, ONLY when their Pallet/container is fully wrapped in plastic: Apples, Bananas, citrus fruit, cucumbers, litchis, mangoes, melons, papayas, pears, pineapples, sweet pepper, stone fruit, tomatoes, grapes & berries. <i>Preferred order of loading is CPT 3 and 4 first followed by CPT 1 and then CPT 2.</i>	PEP	3, 4 and 5		<ul style="list-style-type: none"> 1. Pallets must be fully wrapped in plastic. 2. When stowed in the rear hold, ensure that the appropriate cargo CPT heating switches are set to ON/LOW. 3. Not in same CPT as RPB or RIS unless RPB, RIS and PEP are in separate closed ULDs. 4. PEP and AVI must be separated by a minimum of 30 cm, 12 inches. 	Yes	Yes
	Additional restrictions when loaded in CPT 1.	PEP		1		<ul style="list-style-type: none"> 1. Up to 2 half width ULDs (AK size) can be loaded in CPT 1. 		
	Additional restrictions when loaded in CPT 2.	PEP		2		<ul style="list-style-type: none"> 1. Up to 2 pallets or 4 half width ULDs (AK size) may be loaded in CPT 2. 2. Pallets and ULDs must be kept in a cool area as near to time of loading as possible. 		
I.	Perishable Cargo	<i>Preferred order of loading is CPTs 3 and 4 first, followed by CPT 1 and then CPT 2.</i>	PER	3, 4 and 5		<ul style="list-style-type: none"> 1. Pallets must be fully wrapped in plastic. 2. When stowed in the rear hold, ensure that the appropriate cargo CPT heating switches are set to ON/LOW. 3. Not in same CPT as RPB or RIS unless RPB, RIS and PER are in separate closed ULDs. 4. PER and AVI must be separated by a minimum of 30 cm, 12 inches. 5. Must always be accompanied by a commodity code (e.g. PEP, PEU, PES, PEM, PEF etc.) 6. Where accompanying commodity codes state different Cpt restrictions or limits these will take priority over PER. 	Yes	Yes
			PER	1		<ul style="list-style-type: none"> 1. Up to 2 half size ULDs (AK size) can be loaded in CPT 1. 		
			PER	2		<ul style="list-style-type: none"> 1. Up to 2 pallets or 4 half size ULDs (AK size) can be loaded in CPT 2. 2. Pallets and ULDs must be kept in a cool area as near to time of loading as possible. 		
						Note: In all cases, perishable goods must not be carried in any hold when the holds heating is set at ON/HIGH.		



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Ref No	Class	Item	Code	Compartment	Limitations	Notes	Entry Required	
							NTC	LDM
J.	Seafood		PES	ANY		1. PES and AVI must be separated by a minimum of 30 cm (12 inches). 2. Not in same CPT as RPB, RIS unless RPB, RIS and PES are in separate, closed ULDs. 3. When stowed in the rear hold, ensure that the appropriate cargo CPT heating switch is set to 40°F or 4°C.	Yes	Yes
K.	Un-packed Fruit and Vegetables <small>Unpacked means loose in outer boxes and will either be packed at the destination or sold loose. Exempt items that are loose but can be coded as PEP are given in the PEP section (H) above. PEU items are NOT permitted in CPT 2.</small>	<i>Preferred order of loading is CPTs 3 and 4 first, followed by CPT 1.</i>	PEU	3, 4 and 5 1		1. Pallets must be fully wrapped in plastic. 2. NEVER load PEU in CPT 2. 3. When stowed in the rear hold, ensure that the appropriate cargo CPT heating switches are set to ON/LOW. 4. Not in same CPT as RPB or RIS unless RPB, RIS and PEU are in separate closed ULDs. 5. PEU and AVI must be separated by a minimum of 30 cm, 12 inches. Note: In all cases, perishable goods must not be carried in any hold when the holds heating is set at ON/HIGH.	Yes	Yes
L.	Hatching Eggs		HEG	ANY		Not in the same CPT as RCL. When ICE is carried see Table <i>Dangerous Goods (Ref: 19-21)</i> (Ref 19).	Yes	Yes
M.	Paper, Plastic And Other Inflammable Materials		—	ANY		Do not load near light fittings.	No	No
N.	Undeveloped Film		FIL	ANY		1. Stow at least 16 ft (4.9 m) from RRY. 2. If colour film, do not load directly on hold floor.	No	Yes
O.	Petrol/Diesel Powered Vehicles or Engines		—	ANY			No	No
P.	Catering equipment and food supply not used on flight		CSU	ANY		1. Not in the same CPT as AVI. 2. Not in the same CPT as RPB, RIS unless RPB, RIS, CSU are in separate closed ULDs. 3. Check that the compartments are clean and free from debris.	No	Yes

Note: Other cargo requiring special handling, e.g. drugs, dry ice, human eyes insecticides, medical supplies, odiferous cargo, wet cargo, see cargo SOPs M05.

3.5 Special Loading Facilities and Accessories

Location	Ldg Inst/ Report	Loadsheet	Balance Chart	LDM	Notes
1. Security Locker Located under the stairs at door 2L. Located at the rear of the upper deck passenger cabin.	–	Include load in CPT 0.	Nil	DIP	1. Max volume 3.2 cu ft (0.1 cu m). 2. Max weight 20 kg.
	–	Include load in CPT 0.	70 kg or less – Nil. More than 70 kg – convert to equivalent passengers in cabin OB.	DIP	1. Max volume 10.8 cu ft (0.3 cu m). 2. Max weight 91 kg.
2. Infant Car Seat Ideally car seats should occupy window seat positions, although other locations may be acceptable, providing that access to the aisle from any other seat in that row is not restricted. If a family requires two car seats for infants, the second seat may occupy the aisle seat of a triple unit. Do not use emergency exit rows, or rows immediately forward or aft of emergency exit rows.	–	Included in passenger weight (child weight used instead of infant weight).	–	–	1. Infant must be under 3 years of age but not less than 6 months old. 2. Only approved seats are allowable (see Customer Service Manual, Inst C/7). 3. Responsible adults must occupy adjacent seats (see Customer Service Manual, Inst C/7).



3.6 Special Instructions

3.6.1 ULD Labelling

For Standard Instructions See Cargo SOPs Section H and GOM

Most ULDs are fitted with two label holders, one on each side of the unit, to accept an A5 size label.

The following labels are used:

Label	Colour	Detail	Use
K391 1"	White		Standard ULD Label
K394 4"	White	Red Hatched	Dangerous Goods Label
M319	Red		Unserviceable ULD Label

3.6.2 Incapacitated Passengers – Seats to be Occupied

1. Do not seat incapacitated passengers in the upper deck cabin.
2. Do not seat incapacitated passengers in emergency exit rows.

3.6.3 AFT Hold Cargo Heating

1. Temperatures in compartments 3/4, and 5 are controlled by a switch adjacent to each compartment door. Two temperature selections are available, 40°F and 65°F (4°C and 18°C).

Under normal circumstances the switches should be set to 65°F (18°C). Only if the nature of the load to be carried in compartments 3, 4 and 5 requires a lower temperature should 40°F (4°C) be selected.



3.7 Special Load – Notification to Captains

3.7.1 Introduction

The Captain is finally responsible for the safe loading of their aircraft and it is especially important for them to be notified of load of a potentially hazardous nature as soon as possible.

They may wish to inspect it before departure.

The Captain must also be advised of live animals, munitions of war, valuable consignments and human remains.

The notification procedure described is an IATA – Airport Handling Committee standard. Compliance on your part, or that of your Handling Agent, is essential.

Who originates the Notification, and where, are matters for local decision. Live animals carried as baggage must be included.

For flights where no Dangerous Goods or other special loads are carried, a "NIL" NOTOC will be provided but is not legally required.

3.7.2 Form NR and Distribution

M214 or local equivalent. Specimen on page 05-07-03. Minimum of 2, original for Captain and 1 for loading station's file.

3.7.3 Completion of Form

Ref. Nr	Printed Heading	Completion
1.	Station of Loading	Self-explanatory.
2.	Flight Number	Self-explanatory.
3.	Aircraft Registration	Self-explanatory.
4.	Date	Self-explanatory.
5.	Prepared by	The person or office preparing the notification prior to its release to the weight and balance office or ramp.
6.	Station of Unloading	Station of unload for this flight (IATA 3-letter airport code).
7.	Air Waybill Number	Self-explanatory.
8.	Proper Shipping Name	The full name as per Shipper's Declaration.
9.	Class or Division for Class I, Compatibility Group	As per Shipper's Declaration.
10.	UN or ID Number	As per Shipper's Declaration.
11.	Subsidiary Risk	As per Shipper's Declaration.
12.	Number of Packages	Self-explanatory.
13.	Net Quantity or Transport Index per package	Net quantity per package in kilogrammes or litres; e.g. 15 kg. For RRY (yellow label) enter the transport index per package; Ti 7.4.
14.	Radioactive Category	Not Permitted.
15.	UN Packing Group	As per Shipper's Declaration.
16.	Code	Cargo Imp Code.
17.	CAO	Enter X for cargo aircraft only items.
18.	Loading Position	Enter the loading position.
19.	Other Special Load	Specify kind of animal. Otherwise self-explanatory.
20.	Additional Information	Self-explanatory.
21.	Loaded as Shown	Signature of responsible agent.
22.	Captain's Signature	Self-explanatory.

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B747 Load and Balance

BRITISH
AIRWAYS

		(1) Station of loading (2) Flight			(3) A/C Regn (4) Date	Special load – notification to Captain (5) Prepared by									
Dangerous Goods															
Station of unloading	Air Waybill Nr (last 4)	Proper shipping name	Class or division, for Class 1 also compatibility group	UN or ID number	Subsidiary risk	Number of packages	Net quantity or transport index per package	For radioactive material - the category of the package	Packing group	Code	CAO (X)	Loaded ULD ID	Compartment/Position		
SVO	1234	BUTYRYL CHLORIDE	3	2353	8	2	1L		II	RFL			31P		
SVO	5678	MERCURY OXIDE	6.1	1641		1	25KG		II	RPG			31P		
SVO	9012	RADIOACTIVE MATERIAL SPECIAL FORM NOS.	7	2974		1	3.0T ¹	III		RRY			32P		
NRT	3456	CARTRIDGES, SIGNAL	1.4S	0405		3	15KG			RXS			41P		
(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)		(18)		
Other special load - including AVI MUW VAL HUM (19)															
Station of unloading	Air Waybill Nr (last 4)	Nr of packages	Contents/Description					Quantity	Code	Loaded ULD ID	Compartment/Position				
NRT	7890	1	REVOLVERS					10KG	MUW		5				
NRT	8432	1	DIAMONDS					1KG	VAL		22L				

Additional information
(20)

There is no evidence that any damaged or leaking packages have been loaded on the aircraft

Loaded as shown
(21)Captain's signature
(22)

M214(2nd)

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3.8 Stowage and Restraint of Items Loaded in Passenger Seats

3.8.1 Positioning of Cabin Loaded Items

Instruction – All Articles

1. Do not exceed 50 kg maximum at each seat place, or 32 kg per item.
2. Ensure for each item loaded on or at seat position that the centre of mass is not more than 30 cm (12 in) above the top of the seat cushion.
3. In any category or combination of categories, a maximum of 2 articles per passenger is allowed, contents to comply with restrictions on dangerous articles.
4. No articles to be carried in emergency exit rows.
5. Only passenger accompanied items are allowed in the cabin.

Article	Pos	Stowing Details	Limitations				
Special items, e.g. Life Support Equipment Human Organs Blood Plasma Medical Supplies Scientific Instr's Collectors' Items Miniature Models Works of Art	Window Seat	Items requiring only one seat may be loaded on any approved window seat in Club or Traveller cabin. As armrests in Club do not lift up, items requiring more than one seat may only be loaded on approved seat in Traveller cabin. Use window seat first, then centre seat, then aisle seat if required. Raise intermediate armrest as appropriate. Place article against seat back and secure to seat with seat belt and/or approved lashing equipment as per Load and Balance Manual <i>Cargo Restraint</i> . See also <i>3.8.4 – Restraint of Special Items on Passenger Seats</i> .	Size Limits cm (in)				
			ONE SEAT	TWO SEATS	THREE SEATS		
			Length	43 (17)	91 (36)	140 (55)	
			Width	43 (17)	43 (17)	43 (17)	
			Height	51 (20)	51 (20)	51 (20)	
			Carried at owners risk.				
			Do not load more than 35 kg. on the seat cushion.				

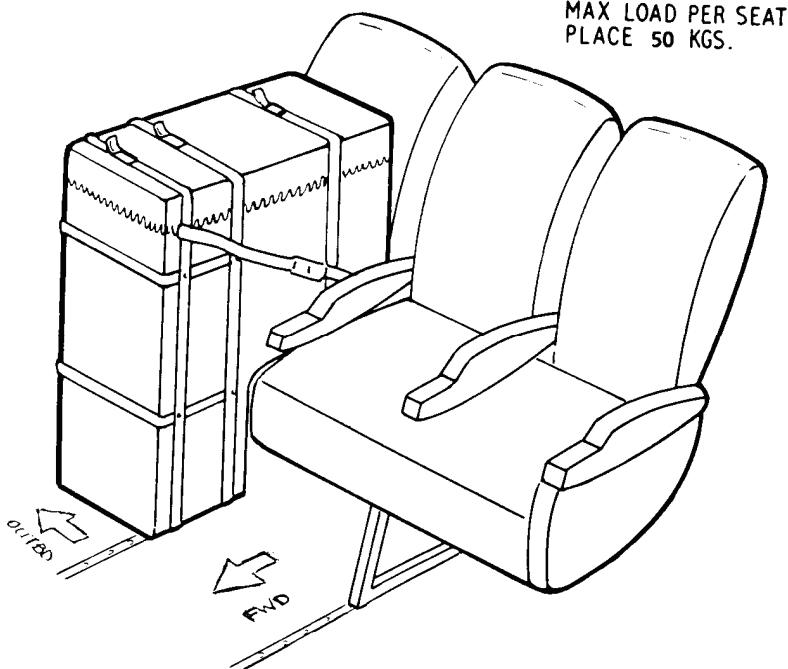


Article	Pos	Stowing Details	Limitations									
Works of Art on Cabin floor	Any Cabin	<p>Items resting on Cabin floor and secured to seats, with approved 8 mm diameter polypropylene rope.</p> <p>Use pillows or blankets to prevent damage to artwork or armrests.</p> <p>See <i>3.8.6 – Securing of Works of Art to Passenger Seats</i></p>	<p>Size Limits cm (in)</p> <table border="1"> <tr> <td>Length</td><td>115</td><td>(45)</td></tr> <tr> <td>Width</td><td>13</td><td>(5)</td></tr> <tr> <td>Height</td><td>91</td><td>(36)</td></tr> </table> <p>Carried at owners risk.</p>	Length	115	(45)	Width	13	(5)	Height	91	(36)
Length	115	(45)										
Width	13	(5)										
Height	91	(36)										
Queen's Messenger Mail	F Cabin	<p>Use Seat A and if necessary K</p> <p>Use seat container</p> <p>See <i>3.8.2 – Fitment and Use of Seat Container</i>.</p>	Max weight 50 kg per seat place (incl. weight of seat bag if used). Not more than 35 kg may be loaded on the seat cushion.									

3.8.2 Fitment and Use of Seat Container

Note: Seat container to be used for passenger accompanied articles.

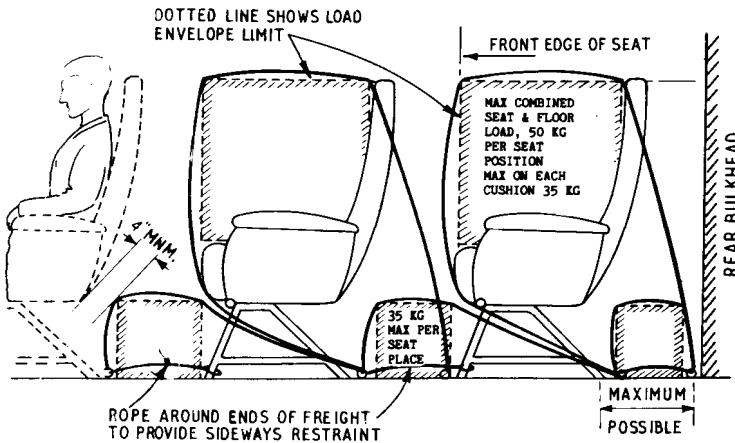
- A. Place the container on the seat as shown in the illustration below.
- B. Loosely connect the container straps to the seat straps.
- C. Open the container by releasing the three clips at the top of the container and undoing the zip.
- D. After loading the container close it by doing the zip up and fastening the three clips at the top of the container.
- E. Fully tighten the straps holding the container in position on the seat.



3.8.3 Securing of Rigid Items Longer Than 24" Length

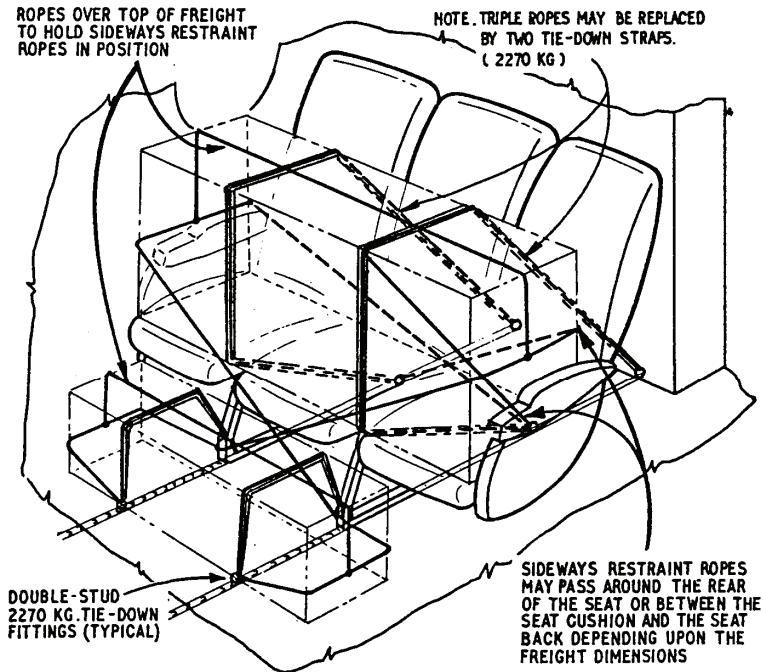
- A. The items of freight must be of a rigid nature so that they will be confined within the restraint ropes and not bulge or deflect onto the seat in front when subjected to severe forward acting loads (non-rigid items must be placed in seat bags).
- B. Obtain the following approved equipment (see [Section 2.4](#)).
 1. Standard issue cabin equipment blankets.
 2. 1" circumference (3/8" diameter) polypropylene rope (950 kg minimum breaking strength).
 3. Tie-down fittings (2270 kg minimum breaking strength).
 4. Optional 1 3/4" wide tie-down straps (2270 kg minimum strength).
- C. Remove seat rail capping strip and attach tie-down fittings at the positions shown, in both seat tracks. Raise centre armrests.

- D. Protect seats with cabin blanket and place items of freight on floor and/or seat as shown below. The load shall not protrude above seat back nor forward of the front of the seat. The combined floor and seat load shall not exceed 50 kg per seat position.



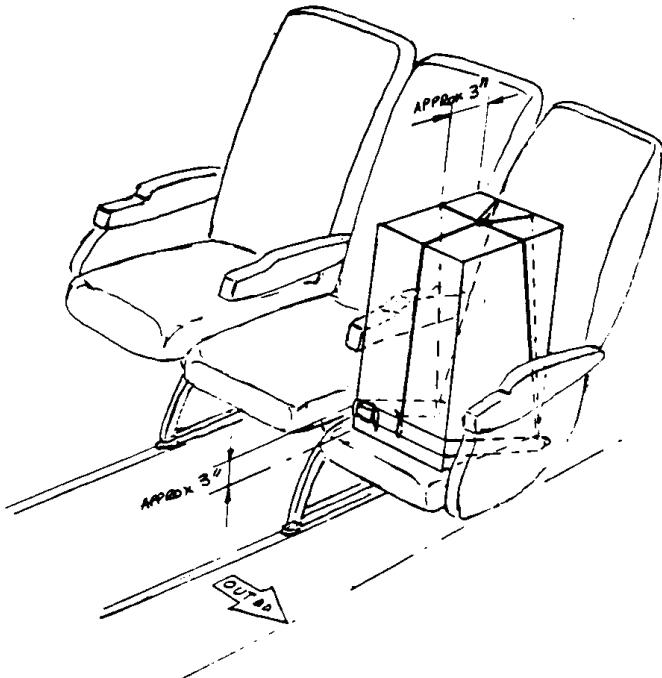
- E. The loading of freight on seats must commence from the rear row and progress successively forward.
- F. Length of items must not be greater than width between fixed armrests; and must be sufficient for ropes from both seat tracks to pass over the item (24" minimum).
- G. The restraint shown is adequate for single items on the floor or seat row. Where the freight consists of a number of packages additional ropes shall be used to prevent sideways movement of each item. The sideways restraint ropes must terminate at tie-down fittings or to the bottom end of the seat legs. Alternatively, this may be achieved by pre-assembly of the loose items onto tied bundles with ropes around the ends of each item.
- H. Cover freight with blanket to preserve cabin appearance.

I. A pictorial view of the restraint rope configuration is shown below.



TYPICAL TIE-DOWN ARRANGEMENT FOR CABIN LOADING
OF RIGID ITEMS NOT LESS THAN 24 INCH LONG

3.8.4 Restraint of Special Items on Passenger Seats



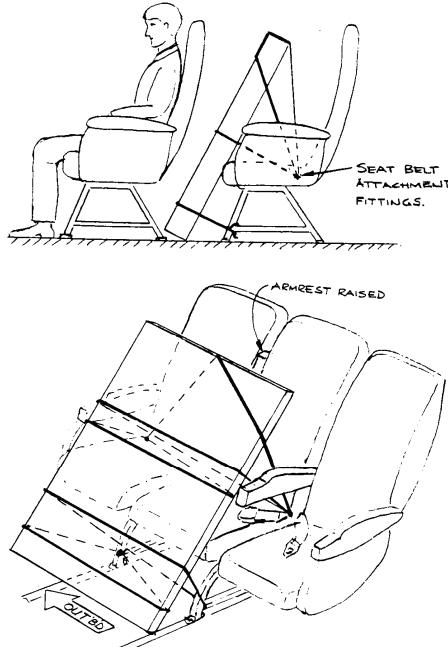
1. Place item on seat cushion, firmly against upright seat back.
2. Fasten seat belt tightly around base of item, approximately 3" above cushion use seat belt extension if necessary.
3. Using approved tie-down rope, secure one end around seat belt attachment fitting and pass the rope over the top of the item, approximately 3" from the back and tie-off the rope at the opposite seat belt attachment.
4. To prevent the seat belt dropping down, and the top rope sliding off the rear of the item, use approved rope over the top and front of the item to hold these in position without unnecessary tension.
5. To complete the restraint arrangement, use approved rope from each seat attachment fitting, passing up behind the item and tied-off to the existing knot on top of the item.

3.8.5 Restraint of Cellos

See *OM B – General Procedures Subsection 2.3.3 – Musical Instruments, Paintings or Bulky Items.*

3.8.6 Securing of Works of Art to Passenger Seats

- A. Place item on floor leaning aft against seat cushions or armrests, with bottom edge clear of the seat attachment of the next forward seat row. Protect armrests with pillow or blanket.
- B. Use approved rope to provide sideways and forward restraint of the bottom of the item by tying one end of the rope to the outboard leg, passing it around the forward face of the item, and back to the same outboard leg. This prevents inboard movement.
- C. Similarly, to prevent forward and outboard movement, tie one end of a rope to the inboard leg, pass it around the item and back to the same inboard leg.
- D. To prevent forward and sideways movement of the upper end of the item, use the same procedure as paras B and C, but with the rope ends tied off to the seat belt attachment fittings instead of the seat legs.
- E. To provide upwards restraint, tie one end of a rope to one seat belt attachment fitting, pass the rope around the front face and over the top edge at the approximate centre, and tie off to the other seat belt attachment fitting.



3.8.7 Special Works of Art

Special works of art are carried on BA flights and this procedure is to assist with that process. It should be noted that all items are cabin loaded and restraint methods shown are applicable to all cabin loaded items. Rules for this collection and other cabin loaded items may differ.

The works of art are shipped in special designed cases, like type cases may slot/join together. It is possible to load up to 3 (maximum) cases, (see + below). The Dimension of these cases are shown in the table below. The booking process can be seen on CIC*64/62.

An accompanying passenger will always travel in the Club cabin.

This procedure is owned by Airport Procedures and Publications on LHRGGBA.

Grey Cases	Dimension	Gross Weight
Type A (Royal)	45.8 x 61.0 x 13.0 cm 18.0 x 24.0 x 5.1 in	19 kg 41 lb
Type B (Imperial) *	60.0 x 75.5 x 10.5 cm 23.6 x 29.7 x 4.1 ins	18 kg 39.5 lb
Type C (Atlas) *	68.5 x 89.8 x 9.5 cm 26.9 x 35.3 x 3.7 in	20 kg 44 lb

Blue Cases

Type D (i) (Royal without expander)	51.0 x 62.5 x 10.5 cm 20.0 x 24.6 x 4.1 in	12 kg 26.5 lb
Type D (ii) (Royal with expander)	x 62.5 x 13.5 cm 20.0 x 24.6 x 5.3 in	18 kg 39.5 lb
Type E (i) (Imperial without expander) *	x 77.5 x 9.5 cm 23.6 x 30.5 x 3.7 in	13 kg 28.5 lb
Type E (ii) (Imperial with expander) *	x 77.5 x 12.5 cm 23.6 x 30.5 x 4.9 in	20 kg 44 lb
Type F (Atlas) *	x 90.0 x 13.5 cm 27.5 x 35.4 x 5.3 in	18 kg 39.5 lb

Silver Cases

No. 1 (RL6) (Imperial) *	64.5 x 88.0 x 16.0 cm 25.3 x 34.6 x 6.2 in	25 kg 55 lb
No. 2 (RL 7) (Royal) *	51.0 x 74.5 x 18.3 cm 20.0 x 29.3 x 7.2 ins	25 kg 55 lb

Club World Seats

No cabin loading is permitted in First Class.

The maximum dimensions for cabin loaded items (Dusk where applicable) Club World seat is:

20 inches high x 17 inches wide x 27 inches deep

These dimensions must not be exceeded, and are applicable for all longhaul flights.

From the above table the following case types can be loaded onto a seat:

Grey Case Type A (Royal) – Maximum of 3.

Blue Case Type D (i) (Royal without expander) – Maximum of 3.

Blue Case Type D(ii) (Royal with expander) – Maximum of 3.

+ The cases marked with an * cannot be loaded on seats and are to be carried in a suitable wardrobe with prior authority from Trisha Windsor (Business Manager to Director Customer Services and Operations) via email.

Cases loaded in wardrobes must not exceed the unit floor loading limits (per decal) and must be packed in to limit any movement during flight.

Restraint of Carrying Cases

The location is the forward bulkhead position of the Club World Cabin Lower Deck.

Note: No Cabin Loading is permitted on the upper deck (where applicable).

The window seat is used for the cabin loaded items, with the accompanying passenger in the aisle seat.

Remove the seat cover to expose the seat frame. See *Figure 1* below.

Figure 1

Feed one length of rope through the seat belt anchorage points to form a loop.

Repeat this process on the front of the hard frame to form a second loop. See *Figure 2* below.

Figure 2

Note: Take care in routing the tie ropes to seat frame/chassis- Do not interfere with electrical looms/components or seat operating controls.

Use BA approved tie down rope only. This requires 2 @ 5 metre lengths.

Replace the seat cushion and feed the case through the loops. Tighten each loop, cross ropes and take the forward rope to the rear of the load and tie off. Take the aft ropes to the forward end of the load and tie off.

Figure 3

Utilise the seat belt (with extension as necessary) wherever possible.

Cushions and blankets should be used to protect the seats as per the example above.

3.8.8 Fitting of 'Daws Engineering' Disabled Child Travel Chair

(On World/Euro Traveller, Club Europe and World Traveller Plus Seat)

Note: This seat is approved for **Take-off and Landing**.

This Seat is Not Suitable for Club World or First Class Sleeper Seats.

The family will bring the seat with them, and should be pre-boarded to allow the seat to be fitted prior to passenger boarding. The Travel Chair fits on top of the aircraft seat, and straps are passed around the back in the following fashion:

Instructions

1. Place packed Travel Chair on aircraft seat.



2. Undo all straps, and unpack the seat so that it follows the contours of the aircraft seat.



3. Pass 2 straps around back of seat and fasten using Velcro fixings.



4. Adjust footrest to required length.



5. With the aid of the child's carers, strap child into seat using shoulder harnesses and adjust as required, then fasten aircraft seat belt around child and seat in the usual fashion.

6. Make a final check to ensure straps around rear of seat are not fouling seat back trays or seat back video screens.



World Traveller Plus Seat

Similar procedure as above. The picture shows how the Daws seat would look like when correctly mounted and fastened on a World Traveller Plus seat.

