DRAGONAIR

A320/A321/A330

OPERATIONS MANUAL

VOLUME 9

AIRCRAFT PERFORMANCE AND ACARS PROCEDURES

This volume forms part of the Operations Manual.
It is issued by the Operations Department and is
authorised by the General Manager (Operations).

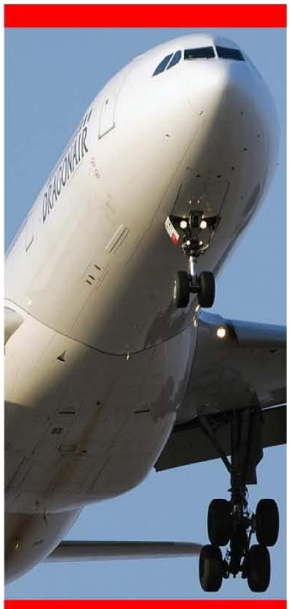
Signed : _____

Peter SANDERSON
General Manager Operations

Revision

The holder of this Volume is responsible for its revision.

DRAGONAIR
港龍航空



安全、質量及保安政策

安全、質量及保安是港龍航空的核心價值。藉著各員工絕不妥協地致力推行各種持續提升質量、保安及安全管理系統計劃，我們務求在這些方面均達到最高的水平。

港龍航空一直以來均十分重視及鼓勵任何有關運作安全及保安事件的報告。我們有既定政策，鼓勵每一位員工向公司匯報任何可能影響航班及地勤營運安全及保安的情況及資料，並積極推動這種文化。我們更製訂了一套程序，適用於航空安全報告、機艙安全報告、地勤安全報告、品質審計報告及保安審查報告所收集紀錄及發放的資訊，確保溝通可以在不受拘束的情況下進行。

我們亦確立機制，以量度及訂立在所有有關安全、質量及保安方面的主要表現水平，並以嚴謹的風險評審，按其重要性訂定改善措施的優先次序。

爲建立互信關係，港龍航空推行公平文化的政策，決不會紀律處分任何匯報有關航班安全事件的員工。但如果有關資訊是來自其他來源，或員工刻意漠視既定的政策及程序，此項政策則不適用。我們希望從錯誤中學習，以不斷提升水平。

作爲行政總裁，我自然責無旁貸，除致力履行承諾提供安全的運作及工作環境，我務請大家積極負責，讓港龍航空繼續在安全、品質及保安方面均達致最高的水平，讓顧客、員工及商業夥伴均受惠，並保持公司在這方面的業界領導地位。

行政總裁　楊偉添

二〇一一年八月

SAFETY, QUALITY AND SECURITY POLICY

Safety, quality and security are core values of Dragonair. We are dedicated to achieving the highest standards in these disciplines by the uncompromising efforts and vigilance of every employee in implementing continuous quality improvement, security and safety management system programmes that are in place in Dragonair.

It is imperative that we have uninhibited reporting of all incidents and occurrences which compromise the safe and secure conduct of our operations. We have a policy of an open reporting culture where every employee is encouraged to communicate any information that may affect the integrity of flight and ground safety and security. Such communication is free of reprisal. Our method of collecting, recording and disseminating information obtained from Air Safety Reports, Cabin Safety Reports, Ground Safety Reports, Quality Audits and Security Inspections has been developed to achieve this aim.

We have established methods to measure and set key performance standards in all the safety, quality and security disciplines coupled with a rigorous process of risk assessment in order to prioritise the deployment of corrective actions in a timely and efficient manner.

To engender mutual trust, Dragonair has a just culture policy where it will not take disciplinary action against any employee who discloses an incident or occurrence involving safety. This policy shall not apply to information received by the company from a source other than the employee, or when the employee knowingly disregards established policies and procedures. We constantly improve our standards by learning from our own mistakes and errors as well as those made by others.

As the Chief Executive Officer I am ultimately accountable and fully committed to providing a safe operational and working environment. However I require you all to take responsibility to ensure Dragonair maintain its industry position as a leader in providing our customers, employees and business partners with the highest level of safety, quality and security.

Patrick Yeung
Chief Executive Officer
August 2011

9.0 INTRODUCTORY

9.0.1 REVISION RECORD SHEET

REV	INCORPORATED	
	BY	DATE
1	INCORPORATED	
2	INCORPORATED	
3	INCORPORATED	
4	INCORPORATED	
5	INCORPORATED	
6	INCORPORATED	
7	INCORPORATED	
8	INCORPORATED	
9	INCORPORATED	
10	INCORPORATED	
11	INCORPORATED	
12	INCORPORATED	
13	INCORPORATED	
14	INCORPORATED	
15	INCORPORATED	
16	INCORPORATED	
17	INCORPORATED	
18	INCORPORATED	
19	INCORPORATED	
20	INCORPORATED	
21	INCORPORATED	
22	INCORPORATED	
23	INCORPORATED	

REV	INCORPORATED	
	BY	DATE
24	INCORPORATED	
25	INCORPORATED	
26	INCORPORATED	
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		
41		
42		
43		
44		
45		
46		

INTENTIONALLY BLANK

9.0.2 OPERATIONS MANUAL STRUCTURE

VOL 1 - FCOM VOL.1 - SYSTEMS DESCRIPTION

VOL 2 - FCOM VOL.2 - FLIGHT PREPARATION

VOL 3 - FCOM VOL.3 - FLIGHT OPERATIONS

VOL 4 - A320/A321/A330 FCTM

VOL 5 - ROUTE MANUAL

VOL 6 - MEL

VOL 7 - EMERGENCY PROCEDURES MANUAL

VOL 8 - COMPANY INSTRUCTIONS

VOL 9 - AIRCRAFT PERFORMANCE AND ACARS PROCEDURES

VOL 10 - FLIGHT CREW TRAINING MANUAL

VOL 11 - CABIN SERVICES MANUAL

VOL 12 - ORGANISATION

THE OPERATIONS MANUAL STRUCTURE IS DETAILED IN VOLUME 12, ORGANISATION; CHAPTER 12.1, OPERATIONS MANUAL; SECTION 12.1.1 STRUCTURE.

INTENTIONALLY BLANK

9.0.3 TABLE OF CONTENT

INTENTIONALLY BLANK

9.0.4 LIST OF EFFECTIVE PAGES

COVER SHEET

Page 1 ..... REV 08 (17 SEP 08)
Page 2 ..... REV 25 (10 OCT 11)

CHAPTER 0 INTRODUCTORY

9.0.1 REVISION RECORD SHEET

Page 1 ..... REV 23 (08 JUN 11)
Page 2 ..... REV 00 (18 JUL 07)

9.0.2 OPERATIONS MANUALS STRUCTURE

Page 1 ..... REV 14 (13 MAY 09)
Page 2 ..... REV 00 (18 JUL 07)

9.0.3 TABLE OF CONTENT

Page 1 ..... REV 00 (18 JUL 07)
Page 2 ..... REV 00 (18 JUL 07)

9.0.4 LIST OF EFFECTIVE PAGES

Page 1 ..... REV 26 (11 APR 12)
Page 2 ..... REV 26 (11 APR 12)
Page 3 ..... REV 26 (11 APR 12)
Page 4 ..... REV 26 (11 APR 12)

CHAPTER 1 TAKEOFF PERFORMANCE

TABLE OF CONTENT

Page 1 ..... REV 21 (17 MAY 10)
Page 2 ..... REV 21 (17 MAY 10)

9.1.1 GENERAL

Page 1 ..... REV 00 (18 JUL 07)
Page 2 ..... REV 01 (12 NOV 07)
Page 3 ..... REV 01 (12 NOV 07)
Page 4 ..... REV 01 (12 NOV 07)

9.1.2 TAKEOFF PERFORMANCE - AIRBUS

Page 1 ..... REV 01 (12 NOV 07)
Page 2 ..... REV 00 (18 JUL 07)
Page 3 ..... REV 01 (12 NOV 07)
Page 4 ..... REV 14 (13 MAY 09)
Page 5 ..... REV 14 (13 MAY 09)
Page 6 ..... REV 00 (18 JUL 07)
Page 7 ..... REV 23 (08 JUN 11)
Page 8 ..... REV 10 (24 NOV 08)
Page 9 ..... REV 23 (08 JUN 11)
Page 10 ..... REV 23 (08 JUN 11)
Page 11 ..... REV 23 (08 JUN 11)
Page 12 ..... REV 23 (08 JUN 11)
Page 13 ..... REV 23 (08 JUN 11)
Page 14 ..... REV 21 (17 MAY 10)
Page 15 ..... REV 21 (17 MAY 10)
Page 16 ..... REV 23 (08 JUN 11)
Page 17 ..... REV 23 (08 JUN 11)
Page 18 ..... REV 23 (08 JUN 11)
Page 19 ..... REV 23 (08 JUN 11)
Page 20 ..... REV 23 (08 JUN 11)
Page 21 ..... REV 23 (08 JUN 11)
Page 22 ..... REV 23 (08 JUN 11)
Page 23 ..... REV 23 (08 JUN 11)
Page 24 ..... REV 23 (08 JUN 11)
Page 25 ..... REV 23 (08 JUN 11)
Page 26 ..... REV 23 (08 JUN 11)
Page 27 ..... REV 23 (08 JUN 11)
Page 28 ..... REV 23 (08 JUN 11)
Page 29 ..... REV 23 (08 JUN 11)
Page 30 ..... REV 23 (08 JUN 11)
Page 31 ..... REV 23 (08 JUN 11)
Page 32 ..... REV 23 (08 JUN 11)
Page 33 ..... REV 23 (08 JUN 11)
Page 34 ..... REV 23 (08 JUN 11)
Page 35 ..... REV 23 (08 JUN 11)
Page 36 ..... REV 23 (08 JUN 11)

9.1.3 TAKEOFF SID PROCEDURES

Page 1 ..... REV 10 (24 NOV 08)
Page 2 ..... REV 10 (24 NOV 08)
Page 3 ..... REV 24 (10 AUG 11)
Page 4 ..... REV 20 (29 APR 10)
Page 5 ..... REV 20 (29 APR 10)
Page 6 ..... REV 20 (29 APR 10)

9.1.4 TAKEOFF IN OTHER CONDITIONS

Page 1 ..... REV 00 (18 JUL 07)
Page 2 ..... REV 22 (16 MAR 11)

CHAPTER 2 ENROUTE PERFORMANCE

TABLE OF CONTENT

9.2.1 COST INDEX

CHAPTER 3 LANDING PERFORMANCE

TABLE OF CONTENT

9.3.1 GENERAL

9.3.2 LANDING PERFORMANCE

CHAPTER 4 ACARS PROCEDURES

TABLE OF CONTENT

9.4.1 GENERAL

9.4.2 ACARS APPLICATIONS

9.4.3 ACARS SYSTEMS AND AIRCRAFT EQUIPMENT

9.4.4 OPERATING INSTRUCTIONS

9.4.5 COMMUNICATION

9.4.6 SYSTEM TROUBLE SHOOTING

9.4.7 LOADSHEETS

9.4.8 ATC INTERFACE

CHAPTER 5 SIMPLIFIED RTOW PERFORMANCE CHARTS

A330

INTENTIONALLY BLANK

TABLE OF CONTENT

9.1. TAKEOFF PERFORMANCE

9.1.1 GENERAL

1. TAKEOFF SPEEDS

V1, the Committal Speed for Takeoff, is the maximum speed at which the pilot must take the first action (e.g. reduce thrust, apply brakes) to stop the aircraft within the ASDA; V1 is also the minimum speed, following a failure of the critical engine, at which the pilot can continue the takeoff and achieve the required screen height within the TODA.

VR, the Rotation Speed, is the speed at which rotation is initiated during takeoff and permits the attainment of V2 at the 35 ft screen height. VR must not be less than 1.05Vmca nor greater than the maximum tyre speed.

V2, the Takeoff Safety Speed, is the minimum speed reached at the 35ft screen height with one engine inoperative and is maintained to the point where acceleration to flap retraction is initiated. V2 must not be less than 1.1Vmca or 1.13Vs1g nor greater than 1.40Vs1g.

2. TAKEOFF DISTANCES

TAKEOFF RUN AVAILABLE (TORA) is the length of the runway available and suitable for the ground run of an aircraft taking off. In most cases this corresponds to the physical length of the runway.

CLEARWAY (TODA-TORA=CW) is an obstacle-free, controlled area beyond the end of the runway.

STOPWAY is a controlled area beyond the end of the runway capable of supporting the aircraft without significant damage.

TAKEOFF DISTANCE AVAILABLE (TODA) is the length of the TORA plus the length of any available Clearway.

ACCELERATE STOP DISTANCE AVAILABLE (ASDA) is the length of the TORA plus the length of any available Stopway. ASDA is also known as Emergency Distance Available.

ACCELERATE STOP DISTANCE REQUIRED (ASDR) for either the engine-out or the all engine case is the sum of:

a. Acceleration distance from brake release to V1.

b. Distance from V1 to application of full braking.

c. Stopping distance with full braking applied.

Time intervals of one second minimum between the engine failure speed (Vef) and V1, and two seconds between V1 and application of the first stopping action, are built into the engine out accelerate stop distance. The ASDR is the greater of either the engine out or the all engine accelerate stop distances.

BALANCED FIELD length occurs when the ASDR equals the TODA.

3. LINE-UP ALLOWANCE

The following corrections to TODA and ASDA are taken into account when calculating take-off performance:

90° Runway Entry

Aircraft	TODA Correction	ASDA Correction
A320	10.9m	23.6m
A321	12.0m	28.9m
A330	25.1m	50.5m

180° Turnaround

Aircraft	TODA Correction	ASDA Correction
A320	16.5m	29.1m
A321	20.9m	37.8m
A330	55.4m	80.8m

4. MAXIMUM TAKEOFF WEIGHT

The maximum takeoff weight is subject to structural limitations but can be further restricted by performance requirements to satisfy the field length, climb gradient or obstacle clearance requirements. Occasionally it may also be limited by brake energy or tyre speeds.

a. A field length limited takeoff weight is obtained by calculation assuming that the takeoff is discontinued from V1 following an engine failure at Vef. The calculation considers the TODA, ASDA and runway slope. Allowances are also made for the effects of pressure altitude, temperature and surface wind.

b. A climb performance limited takeoff weight results when the gross climb gradient with one engine inoperative is equal to the minimum 2.4% required in the second segment of the takeoff flight path, for the specified conditions of temperature and pressure altitude. The second segment is at takeoff thrust with flap remaining at the takeoff setting and the landing gear retracted.

c. The takeoff weights may be limited by the requirement to clear obstacles in the net takeoff path by 35 ft with one engine inoperative. The net flight path is the gross flight path gradient capability of the aircraft reduced by 0.8% to allow for in-service deterioration.

d. Under normal conditions the brake energy capacity of the aircraft is sufficient to handle a stop from V1. Heavy takeoff weights combined with high elevation, downhill slope or tailwind could result in the Maximum Brake Energy Speed (Vmbe) limiting V1.

e. Takeoff speeds are not normally limited by the rated tyre speeds. However, this limitation may occur at high elevation airfields where takeoff ground speeds are high.

MAXIMUM STRUCTURAL TAKEOFF WEIGHT

- This is a weight limitation depending on the aircraft. This limitation is provided in the Flight Manual and in the Limitations chapter of the FCOM 3.

MAXIMUM PERMISSIBLE TAKEOFF WEIGHT (MTOW)

- This is a performance weight limitation read directly from the Performance Charts or calculated using relevant computer software.

REGULATED TAKEOFF WEIGHT (RTOW)

- This is the lesser of the maximum permissible takeoff weight (MTOW) and the maximum structural takeoff weight.

In addition to the limitations imposed by the RTOW, the takeoff weight can also be limited by the maximum ZFW, maximum weight at top-of-climb limited by climb thrust or buffet margin and the RLW. For flights over mountainous terrain, obstacle clearance in the event of an engine failure en-route may further limit the takeoff weight.

INTENTIONALLY BLANK

9.1.2 TAKEOFF PERFORMANCE

1. ACARS RTOW

1.1 INTRODUCTION

The ACARS-RTOW system provides Crew with take-off data through the ACARS. Crew input the request on the MCDU and the request will be sent to the ground computer through ACARS for computation. The result will then be transmitted through ACARS to the flight deck printer. The whole process is fully automatic and does not involve any manual interaction except for the crew making the input request.

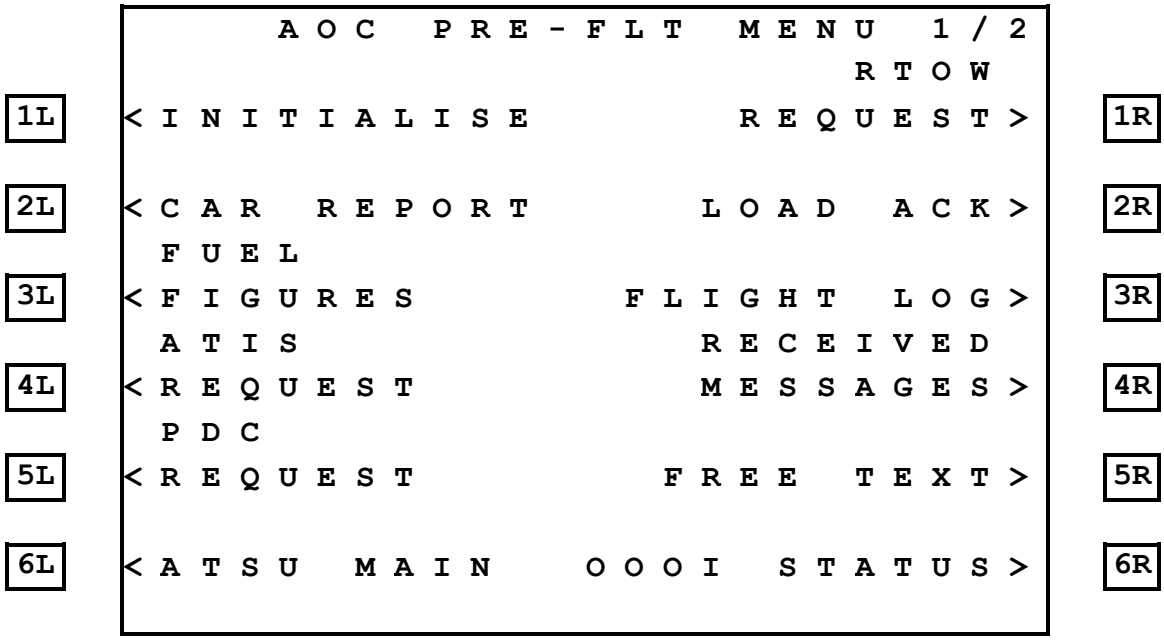
The computation is a real time computation process, not involving any pre-computed chart reading or interpolation process. This means that the results may not be the same as the RTOW Chart output.

1.2 MCDU

All entered data will remain on the input screen to facilitate multiple requests. All fields will be reset to default values after landing. All compulsory input fields, such as A/C Weight, are displayed as boxes and have to be completed.

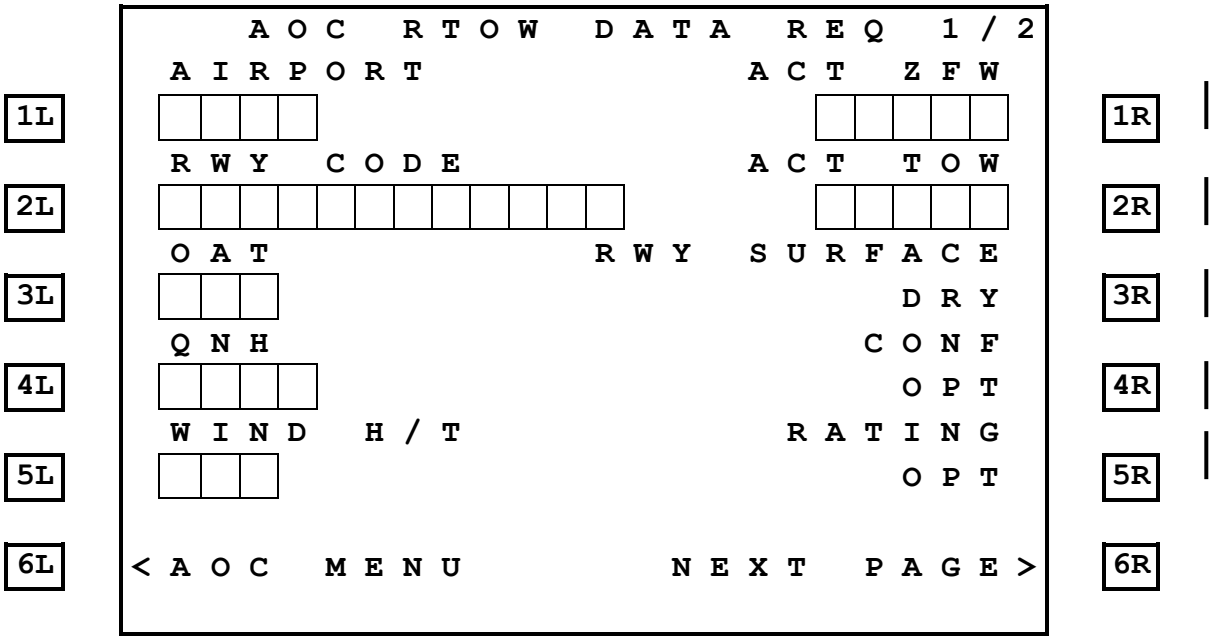
Two types of input screen are available with different headings, but with the same contents, depending on whether the aircraft is fitted with ACARS MU or ACARS ATSU.

ACARS PRE-FLT MENU 1/2



[1R] RTOW REQUEST: Press to display ACARS RTOW DATA REQ page.

ACARS RTOW DATA REQ 1/2



Keys [1L], [2L], [3L], [4L], [5L], [1R] and [2R] are compulsory inputs.

[1L] AIRPORT	Enter 4 letter or 3 letter departure airport code e.g. VHHH or HKG.
[2L] RWY CODE	Enter Runway/Taxiway Code, e.g. 07RJ1. Enter "ALL" for a list of runway codes, or "LST" for a list of runway length data.
[3L] OAT	Enter airport OAT in degrees C. Examples of valid entries are 5, 32, -5, or -10 etc.
[4L] QNH	Enter airport QNH in HPa. Examples of valid entries are 950, 1040 etc.
[5L] WIND H/T	Enter Head or Tail wind component in Kt. Examples of valid entries are 4H, 12H, 1T or 13T etc.
[1R] ACT ZFW	Enter aircraft actual zero fuel weight in decimal tons, e.g. 145.4.
[2R] ACT TOW	Enter aircraft actual take off weight in decimal tons, e.g. 207.9.

[3R] RWY SURFACE

Default is DRY for dry runway. Refer to QRH for additional options. Available options are:

- DRY or D for dry
- WET or W for wet
- WT6 for Standing Water 6mm (1/4")
- WT12 for Standing Water 12mm (1/2")
- SH6 for Slush 6mm (1/4")
- SH12 for Slush 12mm (1/2")
- CSNW for Compact Snow.

Enter "ALL" for a complete list of available runway surface codes.

[4R] CONF

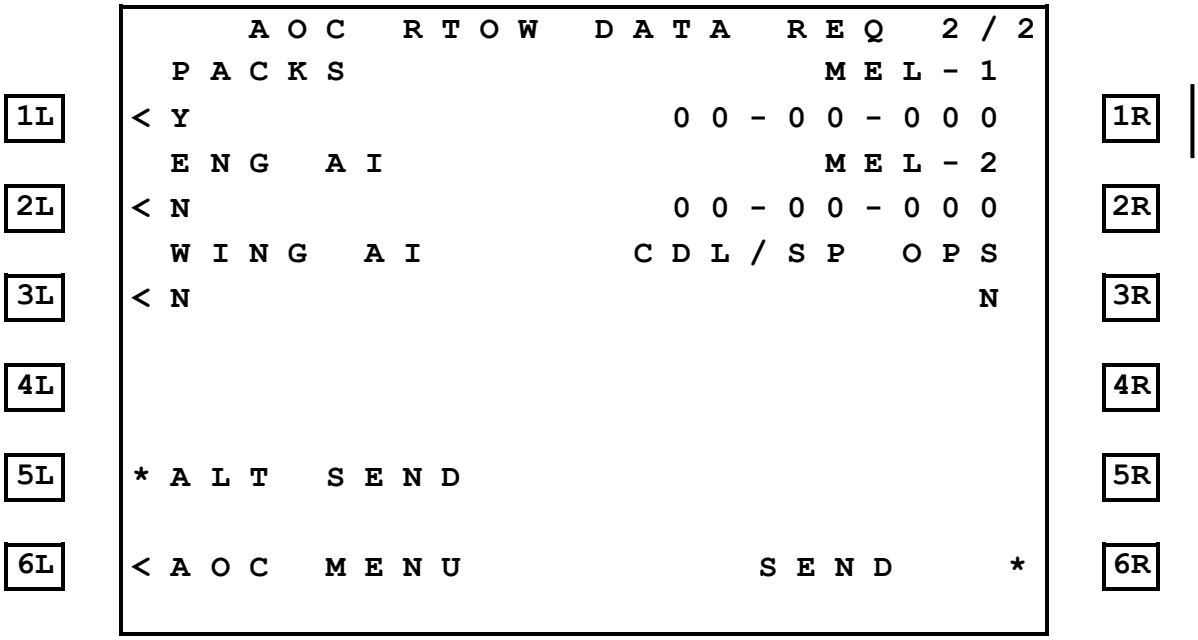
Displays OPT as default for optimum configuration setting which is determined by the program based on the actual conditions. Flight Crew can select any one of the following options:

- 1 for CONF 1+F
- 2 for CONF 2
- 3 for CONF 3

[5R] RATING

Displays OPT as default for optimum thrust rating and Flex Temp, which are determined by the program according to the ACT TOW and input conditions. The other available option is TOGA. If TOGA is manually entered, then Flex Temp will not be provided.

ACARS RTOW DATA REQ 2/2



[1L] PACKS — Default is Packs On - Y. Push to toggle Packs Off.

[2L] ENG AI — Default is Engine Anti-ice - N. Push to toggle Engine Anti-ice - Y.

[3L] WING AI — Default is Wing Anti-ice - N. Push to toggle Wing Anti-ice - Y.

[5L] ALT SEND — Backup key for use when no response from primary SEND.

[1R] MEL − 1 — Displays 00-00-000 as default for no MEL item. Enter MEL number in accordance with the MEL/CDL, e.g. 73-20-02 or 30-11-01B. Refer to MEL/CDL for details.

[2R] MEL − 2 — Permits entry of additional MEL item if required. Input rule same as MEL − 1.

[3R] CDL/SP OPS	Display N for NO CDL or NO Special Operations. This entry is to be used for CDL or Special Operations. A CDL code or a weight reduction can be input for CDL, which is available in the MEL/CDL Manual. Refer to MEL/CDL for details.
[6R] SEND	Press to send the request. All entered data will remain on the page so that it can be modified for multiple requests. All fields will be reset to default values after landing.

1.3 ACARS RTOW PRINTOUT

Output will be transmitted to the flight deck through the printer. The message is divided into three parts.

The first part is a printout of the input parameters (and WIP information, warning message or error message if any) for verification purpose.

The second part is the Main Output, which includes the weight band, CONF, thrust, take-off speeds and engine out acceleration height.

The third part is the supplementary output, which contains RTOW with the associated CONF, and thrust information if any.

Put the printout in the Flight Documents Envelope after use. If more than one printout is produced, only return the one used for takeoff.

Example 1 : Normal ACARS RTOW Output

```
B-HYA     KA900   18AUG05   EDNO VFR  ----------line 1
VHHH:HKG  25LJ9                       ----------line 2
+26C      1007HPA  0HEAD    WET       ----------line 3

PACKS OFF / ANTI-ICE OFF              ----------line 4

-----------------------------------------------
ATOW  167.7            (166.1 - 169.5)  ----------line 5

V1  126  (VMIN 125)          25L TWY J9  ----------line 6
VR  128                                  ----------line 7
V2  133                          CONF 2 (TWO) -----line 8
                                FLEX 62 (F62) -----line 9

                        EO ACC 1500 AAL  ---------line 10
-----------------------------------------------


SUPPLEMENTARY :
RTOW *252.0 CONF 1 TOGA               ----------line 11
```

INFORMATION PROVIDED ON ACARS RTOW PRINTOUT

Line 1 Aircraft Registration Number, Flight Number, Date and 3-figure RTOW Edition number (EDNO).

Line 2 Departure Port in 4 letter and 3 letter code, Runway Code.

Line 3 OAT, QNH, wind component and runway surface condition.

QNH has 2hPa buffer. Buffers are not incorporated for wind or temperature.

Line 4 Air Conditioning ON or OFF, Anti-ice ON or OFF.

Line 5 Actual TOW in tons, valid weight band in tons.

Line 6 V1, minimum V1 controlled by VMCG and runway full name.

Line 7 VR

Line 8 V2 and take-off configuration. Configuration is repeated in brackets.

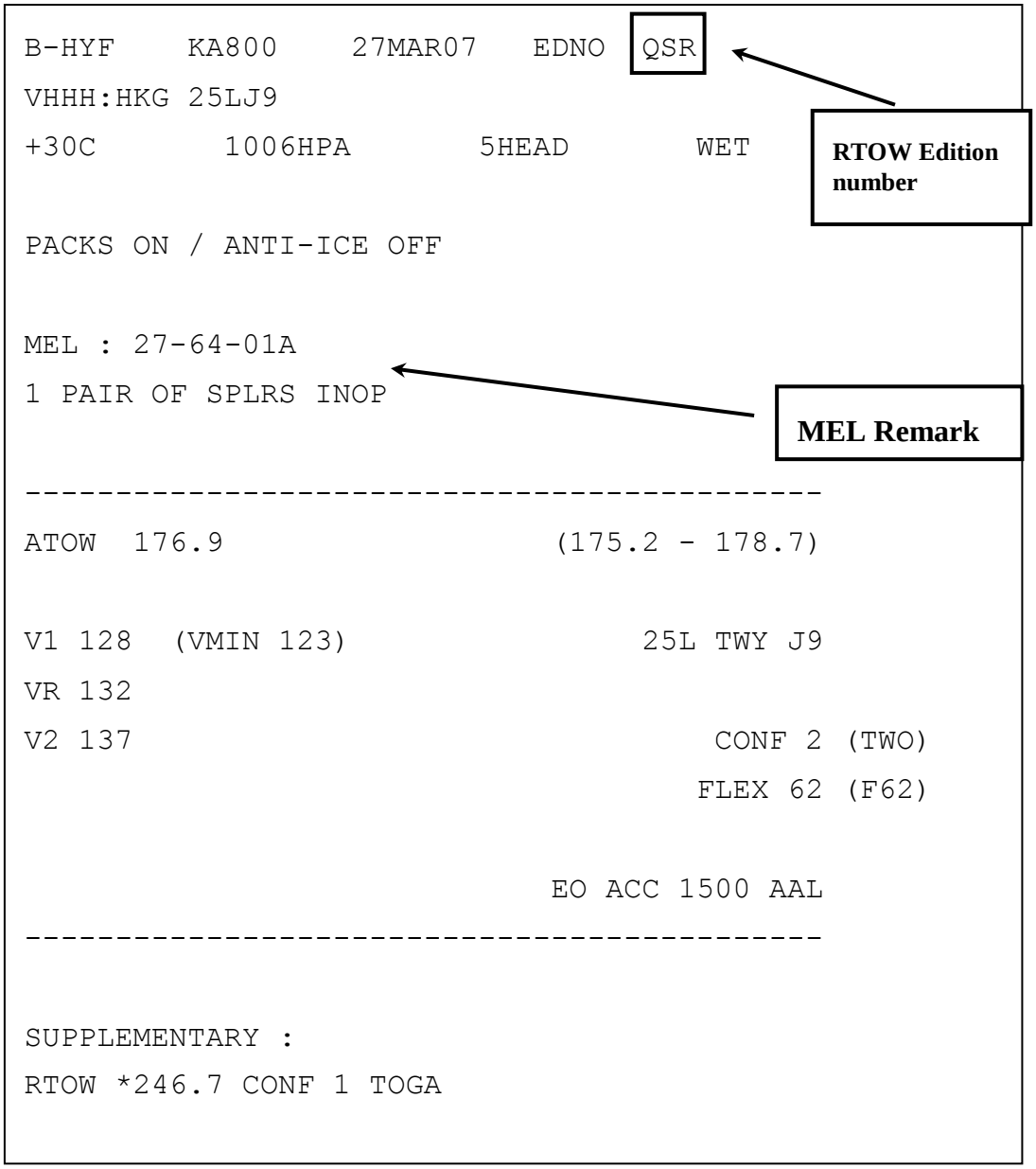
Line 9 Flex temperature (repeated in brackets).

Line 10 Engine out acceleration height AAL in feet.

Engine Out Acceleration Height is temperature-corrected in cold conditions. Use the higher of the ACARS RTOW figure and that on the Port Page.

Line 11 RTOW, corresponding configuration and thrust rating. An "*" denotes that the RTOW is approach climb limited using CONF 3.

Example 2: ACARS RTOW intersection departure with MEL data



Example 3: Output with "RTOW < ATOW, TAKEOFF NOT ALLOWED". ATOW is greater than RTOW, take-off is not possible unless ATOW is reduced to RTOW.

```
B-HYD    KA361    27MAR07   EDNO QST
RJAA:NRT 16L
+29C       1006HPA       5TAIL       WET

PACKS ON / ANTI-ICE OFF

-------------------------------------------
ATOW  203.0                    (---.- - ---.-)

** ATOW > RTOW, TAKEOFF NOT ALLOWED **




-------------------------------------------

SUPPLEMENTARY :
RTOW  202.2  CONF 3 TOGA
```

Highest RTOW for the input weather conditions

Example 4: ACARS RTOW Output (Full Length) with WIP Warning

```
B-HYD    KA2700   27MAR07   EDNO DEF
OPKC:KHI 07R
+29C       1006HPA       5TAIL       DRY

PACKS ON / ANTI-ICE OFF

WARNING:
WIP NOTAMED ON THIS RWY.
CHECK CORRECT RWY CODE IS USED WHEN WIP ACTIVE.
SEE NOTAMS FOR DETAILS.
-------------------------------------------
ATOW  183.0                  (181.2 - 184.4)

V1 135  (VMIN 123)                      07R
VR 135
V2 139                                CONF 2 (TWO)
                                     FLEX 61 (F61)

                              EO ACC 1500 AAL
-------------------------------------------

SUPPLEMENTARY :
RTOW  233.8 CONF 2 TOGA
```

Runway WIP Warning

Example 5: ACARS RTOW Output with WIP remark

```
B-HYD    KA2700   27MAR07   EDNO 000
OPKC:KHI 07RWIP
+29C       1006HPA       5TAIL       DRY

PACKS ON / ANTI-ICE OFF

DECLARED DISTANCES(FT) FOR WIP RWY:
 TORA  TODA  ASDA
 8705 11559  9705
-------------------------------------------
ATOW  183.0                  (181.2 - 183.8)

V1 132  (VMIN 123)                  07R WIP
VR 135
V2 139                               CONF 2 (TWO)
                                     FLEX 54 (F54)

                             EO ACC 1500 AAL
-------------------------------------------

SUPPLEMENTARY :
RTOW  221.5 CONF 2 TOGA
```

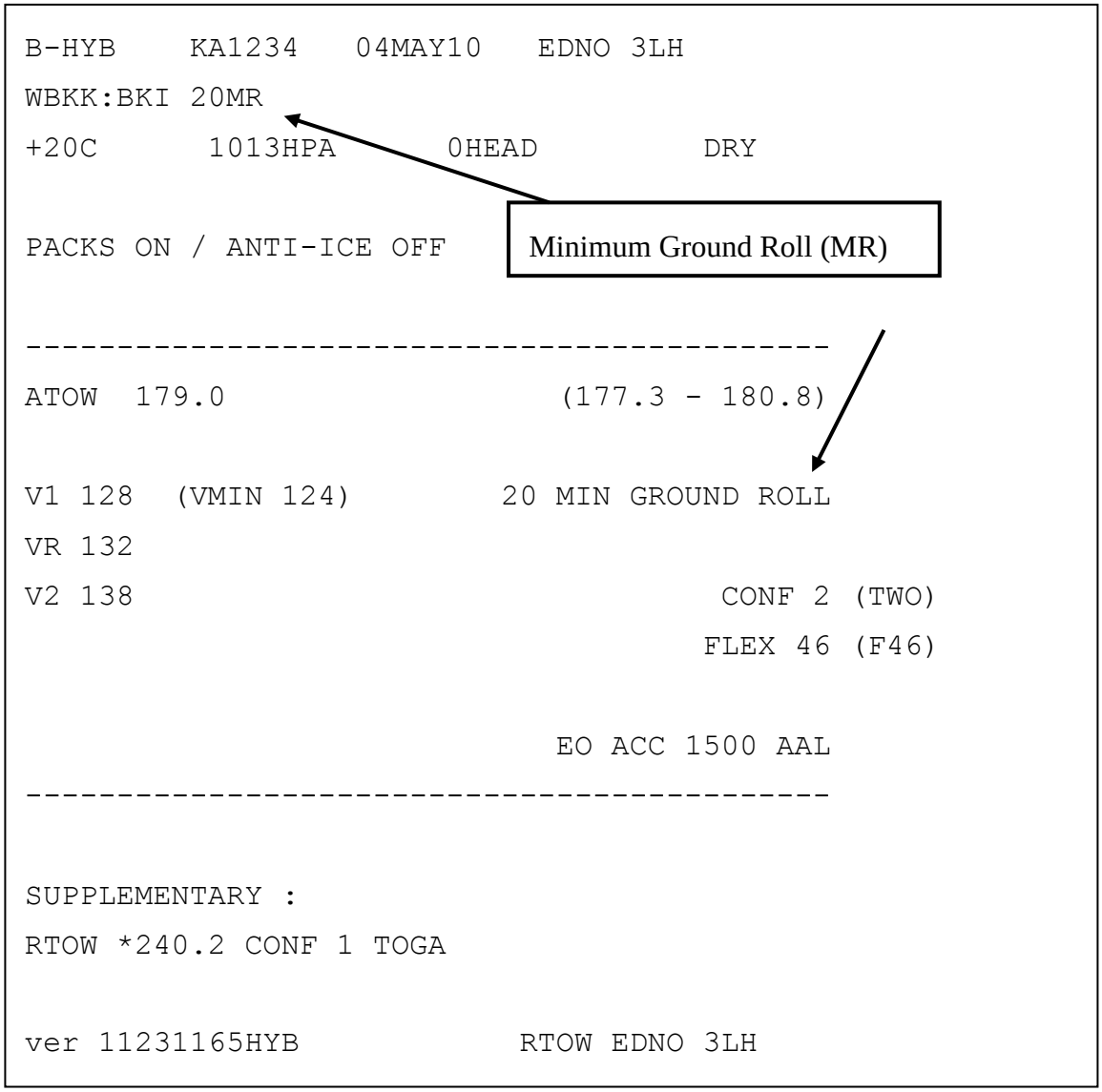
Runway WIP Remark

Example 6: ACARS RTOW Output with RUNWAY CLOSED warning

```
B-HYD    KA722    27MAR07   EDNO TSP
WMKK:KUL 14R
+29C       1006HPA       5TAIL       DRY

PACKS OFF / ANTI-ICE OFF


WARNING:
RWY NOTAMED CLOSED.
SEE NOTAMS FOR DETAILS.
-------------------------------------------
ATOW  183.0                  (181.2 - 185.0)

V1 129  (VMIN 123)                      14R
VR 135
V2 139                                CONF 2 (TWO)
                                     FLEX 62 (F62)

                               EO ACC 1500 AAL
-------------------------------------------

SUPPLEMENTARY :
RTOW *242.5 CONF 2 TOGA
```

Runway CLOSED warning

Example 7: ACARS RTOW Output with MINIMUM GROUND ROLL function



1.3.1 TOGA/FLEX TEMP SELECTION

FLEX temperature will be selected when surplus distances of 5% for all of TODA/TORA/ASDA are available.

Some takeoff conditions or MEL despatch do not allow FLEX Temperature to be used. In these cases, only TOGA data will be provided.

1.3.2 WEIGHT BAND

The Weight Band is provided to reduce crew workload when a minor change in aircraft weight occurs. As long as the ACT TOW is within the weight band, there is no requirement to recalculate the takeoff data.

1.3.3 EFFECT OF QNH & TEMPERATURE

Flex take-off calculations incorporate a 2 hPa pad, thus the takeoff data need not be recalculated unless the QNH decreases more than 2 hPa.

For Flex take-offs, a rise in OAT does not require the data to be recalculated provided the OAT does not exceed the Flex Temperature.

However, for TOGA takeoffs, a rise in OAT requires a new RTOW calculation.

1.3.4 SUPPLEMENTARY DATA

The highest RTOW and associated CONF and thrust rating is provided in the supplementary data area to facilitate weight or fuel uplift planning. The CONF and thrust rating displayed may be different from that displayed in the main output.

1.3.5 IMPROVED CLIMB

Whenever the takeoff, is critical, improved climb can provide an increase in the RTOW. Improved climb is automatically selected, and cannot be selected manually.

1.3.6 RUNWAY CODE

For full length takeoff the runway code is the same as the runway designator e.g. 07R.

Runway intersection and SID

When taxiway intersection takeoff is used, taxiway designator is appended to the end of the runway designator, e.g. HKG 07RJ2 for runway 07R intersection with taxiway J2. When runway data is associated with a particular SID takeoff procedure, a dedicated runway code will be provided, such as 28RXCUSH which stands for 28R takeoff with SIDs except CUIT2/SHOR1. Special runway codes, if applicable, are annotated in the Port Pages.

WIP/OBS

When there is runway work, runway code will be appended with an indicator e.g. 07RWIP for runway work with runway distance change and 07ROBS for temporary obstacles with or without runway distance change. The WIP/OBS runway code will be effective 1 day earlier than the published effective date and be removed 1 day after the published expiry date. Crew are required to check the effectivity of the runway work. When runway work is effective, a warning will be added to the printout if normal runway code is entered. During the effective period the WIP/OBS runway codes are included in the Company Notams.

Runway Closed

When a runway is closed for operation, a warning will be added to the printout if the concerned runway is selected. This warning will be effective in a similar way to WIP/OBS i.e. 1 day earlier than the published effective date and be removed 1 day after the published expiry date. Crew are required to check the effectivity of the runway work.

Minimum Ground Roll (MR)

In order to cater for cases where a runway surface has deteriorated to the extent that a minimum ground roll take-off is desirable, a Minimum Ground Roll feature is available.

Minimum Ground Roll option will be promulgated via Company NOTAM when required. The function will then be available for the specified port/runway. The function is activated by entering "MR" after the runway designator, e.g. "20MR" or "07RJ1MR." Data is normally available for the full length and first usable intersections from the affected runway thresholds.

The RTOW computation is based on the affected runway being shortened by 2000ft (1000ft for shorter runways). Additionally, the maximum Flex temperature is reduced to (ISA+43 (58°C)) {ISA+28 (43°C)} [ISA+31 (46°C)].

When MR is promulgated, its use is preferred but not mandatory. If RTOW data for the full runway length is required, the Commander may select normal data at his discretion. Similarly, a TOGA thrust take-off may be computed using MR or normal data as necessary.

Runway Data

If "ALL" is entered as the runway code, then a complete list of runway codes will be returned.

If "LST" is entered as the runway code, then a complete list of runway length data (in feet) will be returned.

1.3.7 CENTRE OF GRAVITY EFFECT

RTOW data is normally produced for the most forward centre of gravity position, as this loading configuration gives the most conservative data.

A320 only:

When ATOW exceeds RTOW in this condition, it may be possible to obtain a higher RTOW with an aft centre of gravity. If this is the case, the RTOW printout will include a section of data headed "GWCG>=25%" with appropriate RTOW data.

CAUTION: For this data to be used, the loadsheet MUST be cross-checked to ensure that the MACTOW is 25% or greater.

An example of an ACARS RTOW printout showing the additional set of data is shown overleaf.

Example 8: ACARS RTOW Output with CENTRE OF GRAVITY effect included

```
..B-HSG ---- HDA8393    03MAY11 0110Z
FREE TEXT
-HSG    KA8393   03MAY11   EDNO 6PY
RJAF:MMJ 18
+15C      1013HPA      0HEAD         DRY

PACKS OFF / ANTI-ICE OFF


-------------------------------------------
  ****************************************
  *                PACKS OFF               *
  ****************************************
ATOW   69.5                   (---.- - ---.-)

   ** ATOW > RTOW, TAKEOFF NOT ALLOWED **
      CHECK GWCG>=25% DATA BELOW

-------------------------------------------

SUPPLEMENTARY :
RTOW   69.1 CONF 2 TOGA




*** GWCG>=25% ***
-------------------------------------------
  ****************************************
  *                PACKS OFF               *
  ****************************************
ATOW   69.5                   ( 68.9 -  69.5)

V1 133  (VMIN 111)                          18
VR 135
V2 139                                  CONF 2 (TWO)
                                          TOGA (TOGA)

                              EO ACC 3100 AAL
-------------------------------------------

SUPPLEMENTARY :
RTOW   69.5 CONF 2 TOGA

ver 11351177HSG            RTOW EDNO 6PY
HDORDCX 030109
```

Example 9 : ACARS RTOW printout for runway code "ALL"

```
B-HSG    KA000    05MAY11   EDNO 9HF
VHHH:HKG

+30C      1013HPA      0HEAD         DRY


AVAILABLE RWY:
CODE         FULL NAME              TORA
07L          07L                    12467
07LA2        07L TWY A2             11814
07LA3        07L TWY A3             10846
25R          25R                    12467
25RA11       25R TWY A11            11814
07R          07R                    12467
07RJ1        07R TWY J1             11814
07RJ2        07R TWY J2             10269
25L          25L                    12467
25LJ8        25L TWY J8             10499
25LJ9        25L TWY J9             11814
----------------------------------------

----------------------------------------


ver 11351178HSG            RTOW EDNO 9HF
```

Example 10 : ACARS RTOW printout for runway code "LST"

```
B-HSG    KA000    05MAY11   EDNO 9HG
VHHH:HKG

+30C      1013HPA      0HEAD         DRY


AVAILABLE RWY:
CODE          TORA  TODA  ASDA  SLOPE
07L           12467 13451 12467 0.01UP
07LA2         11814 12799 11814 0.01UP
07LA3         10846 11831 10846 0.01UP
25R           12467 13451 12467 0.01DN
25RA11        11814 12799 11814 0.01DN
07R           12467 13451 12467 0.02DN
07RJ1         11814 12799 11814 0.02DN
07RJ2         10269 11253 10269 0.02DN
25L           12467 13451 12467 0.02UP
25LJ8         10499 11483 10499 0.02UP
25LJ9         11814 12799 11814 0.02UP
----------------------------------------

----------------------------------------


ver 11351178HSG            RTOW EDNO 9HG
```

1.4 BACKUP PROCEDURE

When the ACARS system or ground computer is inoperative, various backup systems are available for use. These include "ALT SEND" on the ACARS RTOW page, SMS RTOW, SIMPLIFIED RTOW Charts and WEB RTOW.

If the ACARS system and ground computer are working properly, but a calculation error message is returned, then re-submit the request with the same conditions or select other available options. If that does not resolve the problem, then use SIMPLIFIED RTOW Charts and report the case through the CAR.

1.4.1 ALTERNATE SEND

An "ALT SEND" button is available on the ACARS RTOW input screen. When a communication failure is caused by the ground mainframe system, such as during routine system maintenance, using "ALT SEND" may allow the system to bypass the failure by using a different communication path. This will not help when the communication failure is caused by:

- Aircraft system failure
- Lack of ACARS coverage, or
- Ground system RTOW calculator malfunction

The response time may be longer than that of the normal "SEND" function, typically from 3 to 10 minutes depending on communication traffic. Avoid making several requests from "ALT SEND" as this will only result in a further deterioration of the response time.

1.4.2 SMS RTOW

Note: SMS RTOW may not be available in Japan and Korea for some mobile phones and service providers.

Takeoff data can be obtained via a mobile phone's SMS feature using one of the following methods:

1. Create a text message containing the eight parameters with a blank space between each parameter. The parameters are NOT case sensitive and the order of parameters is NOT significant.

   The eight parameters are as follows:

   - "rtow" - a mandatory keyword
   - Aircraft registration - "hya"
   - Port code - "bkk" or "vtbs"
   - Runway - "r03L" (put letter "r" in front of runway to distinguish from other parameters), "r25r"
   - OAT - "-5", "25"
   - Wind component - "0h", "5t", "10h" (must contain "h" or "t")
   - QNH - "1013"
   - ATOW in ton - "212.5", "180.7"

For example,

```
hya  rtow  hkg  r25lj9  0h  26  167. 7  1007
```

Then send to (+852)-9180 7577. A template containing the recognised parameters will be returned.

For Example:

```
ACREG=HYA  PORT=HKG  RWY=25LJ9  OAT=26  QNH=1007
WIND=0H  TOW=167.7  SURFACE=DRY  FLAP=OPT RATING=OPT
PACK=Y  ANTI ICE=N  MEL1=N  MEL2=N  CDL=N
```

"REPLY" or "FORWARD" the message (depends on phone model) and edit the information if required then send to (+852)-9180 7577 for takeoff data calculation.

Note: *Engine anti-ice (ENG-AI) and wing anti-ice (WING-A1) are grouped together as "ANTIICE".*

---------- OR ----------

2. Send the keyword "rtow" to (+852)-9180 7577. The program will then return the following template:

```
ACREG= ? ? ?  PORT= ? ? ? ?  RWY=R ? ? ?  OAT= ? ?  QNH= ? ? ? ?
WIND= ? ?H  TOW= ? ? ? ?  SURFACE=DRY  FLAP=OPT  RATING=OPT
PACK=DEFAULT  ANTIICE=DEFAULT  MEL1=N  MEL2=N  CDL=N
```

"REPLY" or "FORWARD" the message (depends on phone model) and replace the "?" with appropriate values then send to (+852)-9180 7577 for takeoff data calculation.

For either method takeoff data will be returned in the following formats:

Normal output:

```
HYA  18AUG05  HKG  25LJ9  +26C  1007HPA  OH  DRY
PACKS ON  ANTI-ICE  OFF  TOW  167.7 (166.1-169.5)
CONF  2  F62  126/129/134 123  1500  EDNo: 27C
```

Decode:

ATOW	167.7T
Valid weight band	166.1T – 169.5T
CONF	2
Take-off thrust	FLEX 62C
V1/VR/V2	126/129/134
Vmin	123
EO ACC HT	1500 feet AAL
RTOW Edition No	27C (for input into the RTOW EDNO field in ACARS CAR)

Crew shall transfer the output to the Takeoff Data Form or page 2 of the CFP and crosscheck the data.

When RTOW < ATOW (takeoff not possible with the given ATOW):

```
HYA  06SEP05 FUK  16  +28C  1005HPA  5T  WET  AC
OFF  ANTI – ICE  OFF  RTOW < ATOW,  RTOW  212.2
CONF  2  TOGA
```

Decode:

Highest RTOW	212.2T
CONF	2
Take-off thrust	TOGA

1.4.3 SMS RTOW CHECKING AND RECORDING

1. SMS Take-off data may be requested after receipt of the final ZFW.
2. Both Crew members shall independently check data entered in the SMS on-screen template before sending.
3. Data to be used for take-off shall be recorded on the Take-off Data form (or on CFP page 2 if no forms are available). Both crew members shall independently check that the data entered on the form/CFP agrees with the on-screen SMS Take-off data.
4. Take-off data shall be checked, validated and inserted in the MCDU PERF TO page in accordance with normal procedures for an ACARS RTOW printout.
5. Insert EDNO in the ACARS CAR.

1.4.4 WEB RTOW

The WEB RTOW system is available through the company intranet (Dragonet).

Crew can obtain the RTOW data by either going to the company office and accessing the terminal themselves, OR, by completing a WEB RTOW proforma from the spare documents envelope and asking the ground staff to send the completed form to HKG dispatch.

1.4.5 WEB RTOW DATA CHECKING AND RECORDING

1. Web Take-off data may be requested after receipt of the final ZFW.
2. Both crew members shall independently check data entered on the WEB – RTOW DATA FORM before handing it to Station staff.
3. Web Take-off data should be retrieved and presented to the crew via a printed document.
4. Take-off data shall be checked, validated, and inserted in the MCDU PERF TO page in accordance with normal procedures for an ACARS RTOW printout.
5. Insert EDNO in the ACARS CAR.

Sample Web RTOW Data Form

(Reverse side: Take-Off Data Form)

DRAGONAIR

WEB - RTOW DATA FORM AIRBUS

Fill in or Circle as appropriate

A/C REG: _____ **DATE:** _____

AIRPORT: _____ **FLIGHT NO:** _____

CAPTAIN: _____

RWY CODE: _____
e.g. 07RJ1

ACT TOW: _____ **x1000 Kgs**

OAT: _____ ^{0}C

RWY SURFACE: DRY (default) or _____

QNH: _____ HPa

FLAPS: OPT (default) or _____

WIND: _____ H/T
(select H or T)

RATING: OPT (default) or _____

PACKS: N (default) or Y

MEL-1: 00-000 (default) or _____

NAC AI: N (default) or Y

MEL-2: 00-000 (default) or _____

WING AI: N (default) or Y

CDL / SP OPS: N (default) or _____

To Be Completed by Ground Staff

1. Request the ACARS-RTOW through Dragonet or CX CFD Web Site if available, otherwise
2. Fax this page to HKG Despatch +852 31932113,
   - Please fill in your fax number here for fax reply (_____)_____
   - Follow up by either telex HKGOWKA or phone call to HKG Despatch, +852 31933800
3. Deliver the output to Crew.
4. Return this form to Crew for data verification.

KA/Ops/13 (REV00 04MAY07)

1.5 ACARS RTOW - SUPPLEMENTARY INFORMATION

1.5.1 CONFIG SELECTION

Available options are "OPT", "1", "2" and "3". The default setting is "OPT".

When "OPT" is set, the CONF will be selected in accordance with a predefined priority list.

Some airports may have predefined CONF settings due to noise abatement, or other operating requirements. When "OPT" is selected, the predefined CONF setting if specified will be used automatically. Crew are allowed to choose a CONF setting other than OPT, but will receive a warning or a prohibition on the output if a Port page requirement is applicable.

If "OPT" is selected during MEL despatch, the program will select the CONF as per the MEL/CDL Manual if specified. An error message may be returned if crew request a CONF other than that specified in the MEL/CDL Manual.

1.5.2 THRUST RATING SELECTION

Available options are "OPT" and "TOGA". The default setting is "OPT". When "OPT" is set, the program will select FLEX TEMP or TOGA in accordance with the input conditions.

Some airports may have a predefined thrust rating due to noise abatement, or other operating requirements. When "OPT" is selected, the predefined thrust rating if specified will be used automatically. Crew are allowed to choose a thrust rating other than OPT, but may receive a warning or a prohibition on the output if a Port page requirement is applicable.

If "OPT" is entered during MEL despatch, the program will select the thrust rating as per the MEL/CDL Manual if specified. An error message will be returned if Crew request a thrust rating other than that allowed in the MEL/CDL Manual.

1.5.3 MEL/CDL AND SPECIAL OPERATIONS ITEMS

MEL

Input codes for MEL items that require takeoff performance adjustments are stated in the MEL. Only MEL items that require takeoff performance adjustments are permitted for entry. When more than one method of despatch is possible under the same MEL number, then the input code would normally be appended with an alphabetic character to the end of the ATA number. For example, on the A330 the MEL input code for "1 BRK INOP" is "32-42-01A" while the MEL input code for "2 BRK INOP" is "32-42-01B". Codes must be entered with "dashes" such as "78-30-01".

CDL

Input codes or weight decrements for CDL items that require takeoff performance adjustments are stated in the CDL. Only CDL items that require takeoff performance adjustments are permitted for entry. Codes must be entered with "dashes" such as "57-02". Input without a "dash" will be treated as a manual weight decrement e.g. 5702 means a 5702 KG reduction.

This is because for some CDL items, the weight penalty is given as a "per part" adjustment. Without knowing how many parts are missing/defective, the system is unable to provide the takeoff performance adjustment. Hence, for these cases the CDL input code is not used, and crew should instead add up the total weight penalty and input it into the CDL/SP OPS input field.

The system will then work out the takeoff performance adjustment based on the input weight penalty. For example, if the CDL penalty for each part missing is 200 KG, then for two parts missing, the crew should enter 400 into the CDL/SP OPS field. Input instructions are also available in the MEL/CDL.

The system is unable to handle multiple CDL code entries. For despatch with multiple CDL items the total weight penalty must be calculated manually and the result entered into the CDL/SP OPS field. For example, if the penalty for one CDL item is 363 Kg, and another 205 Kg, the total weight penalty is 568 KG. Enter 568 in the CDL/SP OPS field.

If the multiple CDL performance adjustments involve takeoff speeds adjustment, then ACARS RTOW must not be used. The Operations Engineers must specially provide these complex calculations.

A mix of CDL and MEL calculations may be possible, but crew must ensure the configurations are set in accordance with the MEL/CDL operations restrictions.

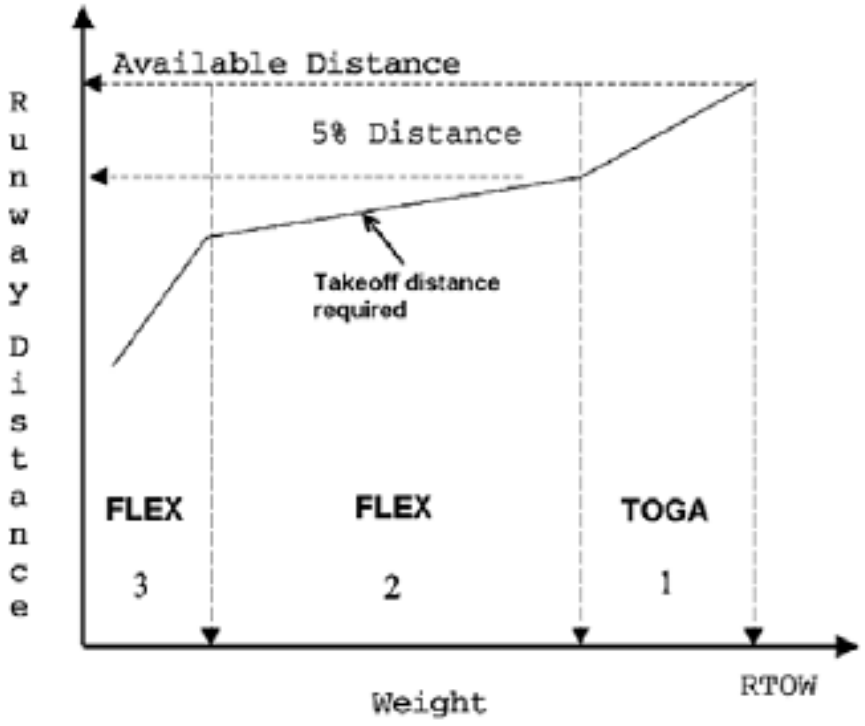
SPECIAL OPERATIONS

Input codes for Special Operations are included in the MEL/CDL.

1.5.4 **TOGA/FLEX TEMP SELECTION LOGIC**

FLEX temperature will be used when surplus distances of 5% for all of TODA/TORA/ASDA are available.

The graph below shows the relationship between runway length, the A/C WT and the thrust.



Region 1:

ACT TOW is at or below RTOW but has not reached the weight where a distance surplus of 5% of declared distance is available, hence TOGA thrust is used.

Region 2:

ACT TOW is such that a surplus of 5% of declared distance is available. Any reduction in Weight would result in an increase in FLEX Temp until the maximum FLEX Temp is reached. The runway distance required will remain fairly constant. The FLEX Temp calculation is based on 95% of the declared runway distance.

Region 3:

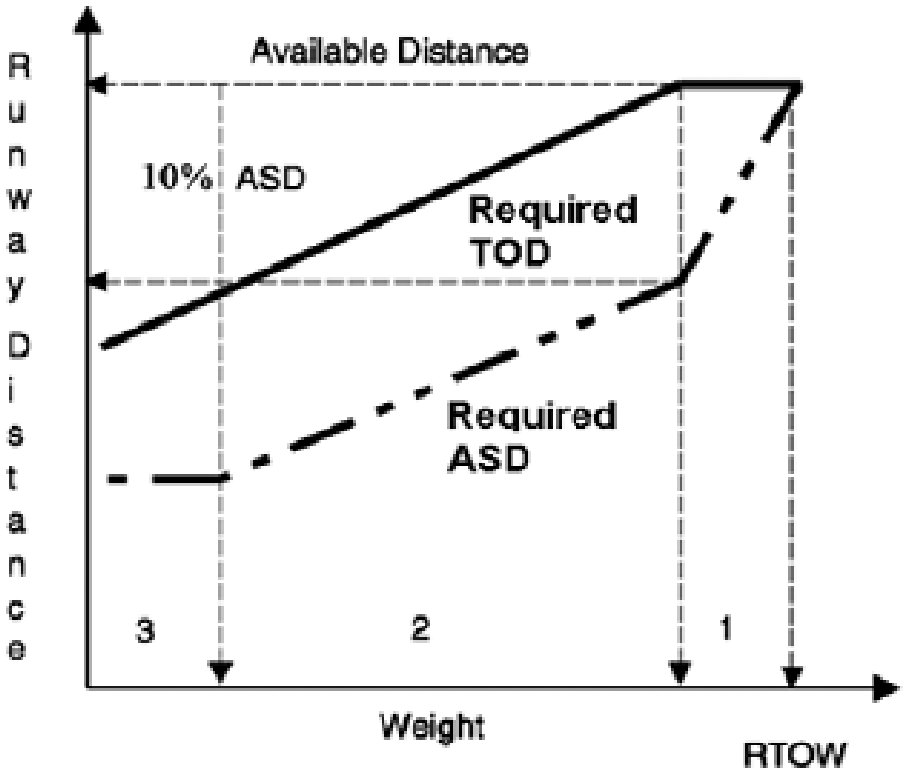
When the FLEX Temperature reaches the maximum, further reduction in ACT TOW will decrease the runway distance required.

1.5.5 **TAKEOFF MARGIN LOGIC**

The default logic is to maximize stopping margin and increases the probability of Continued Takeoff.

When the stopping distance surplus on DRY runway exceeds 10% of the ASDA (15% for a WET or Contaminated runway, or takeoff with MEL items) then the remaining surplus is distributed evenly to the Continued takeoff situation and the Rejected takeoff situation.

The graph below shows the relationship of ASDR/TODR with ATOW.



Region 1:

ACT TOW is less than or equal to RTOW but has not reached the 10% (15% for a WET or Contaminated runway, or takeoff with MEL items) surplus margin in ASD. Hence only stopping margin is available in this region.

Region 2:

ACT TOW is low enough that stopping margin exceeds the prescribed value of the ASDA. Surplus beyond the prescribed value is distributed evenly between Continued Takeoff and Reject Takeoff.

Region 3:

The increase in stopping margin slows down when limited by Vmcg. Go margin continues to increase as takeoff weight decreases.

2. SIMPLIFIED RTOW CHARTS

2.1 INTRODUCTION

ACARS RTOW is to be used as the primary data source for all RTOW calculations. Simplified RTOW Charts are designed as a fallback in case ACARS RTOW, including backup methods, are not available. To cover as many ports as possible, the data is conservative and may not be usable for heavier weights and/or shorter runways.

Note :

1. *Simplified RTOW Charts shall not be used if the applicability of the airport/runway is in doubt.*
2. *Dedicated Simplified RTOW Charts may be available for specific airports / runways to cater for special operations such as freighter or charter flights to offline airports, or where inclusion in either Group A or Group B would impose significant performance penalties at other airports within the groups.*

2.2 RESTRICTIONS

The use of Simplified RTOW Chart is prohibited:

- If temporary obstacles are present in the takeoff direction.
- If WIP affects the runway length.
- For contaminated or slippery runways.
- Performance-related MEL dispatch (except reverser inoperative, see below).

Interpolation or extrapolation is not allowed.

2.3 VALIDITY

2.3.1 TAKEOFF GRADIENTS

Group A Charts provides sufficient takeoff performance for airports that require a lower climb gradient.

Group B Charts provide increased departure performance for airports that require a higher than normal climb gradient.

Dedicated Simplified RTOW charts meet all takeoff gradient requirements for the captioned airport runway.

Charts are valid only for the airports listed in the Group Label Box, or for the captioned airport runway.

2.3.2 QNH

Charts are provided for QNH values of 990 hPa and 1005 hPa.

2.3.3 WIND

Charts are normally provided for a maximum tailwind component of 5 knots.

2.3.4 THRUST

Maximum rated thrust (TOGA) must be used. The use of flex temperature is prohibited.

2.3.5 REVERSER INOPERATIVE

Charts are valid for reversers inoperative.

2.3.6 **ENGINE ANTI-ICE**

Charts are based on Engine Anti-ice ON.

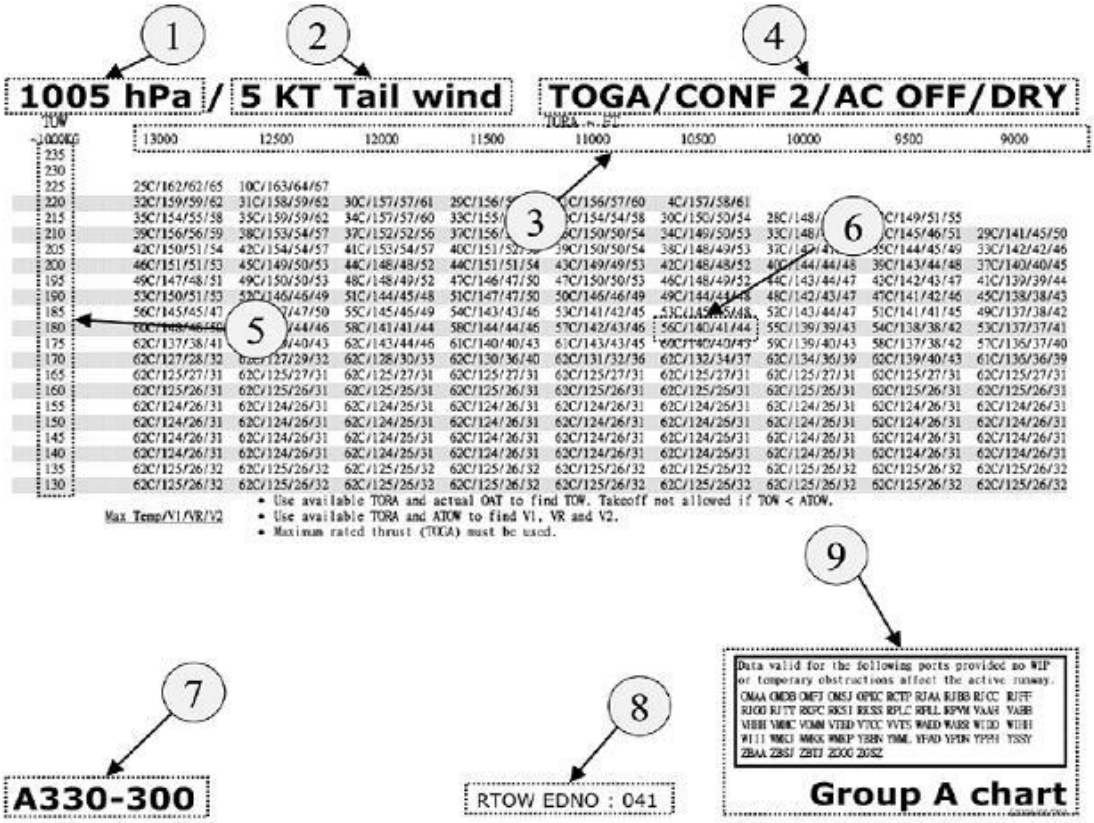
2.3.7 **AIR CONDITIONING (A/C)**

Unless otherwise stated, charts are based on PACKS OFF.

2.4 **SIMPLIFIED RTOW CHARTS**

2.4.1 **CHART GLOSSARY**

1. Minimum QNH.
2. Maximum Tail Wind component.
3. TORA - Available TORA in 500 feet increments.
4. Takeoff configuration and surface conditions.
5. Takeoff Weight in units of 1000KG.
6. Maximum allowable ambient temperature/V1/VR/V2 for the Takeoff Weight and TORA.
7. Aircraft Type.
8. Edition number of the chart - to be entered in the ACARS CAR.
9. Group A Chart Label and list of included airports.

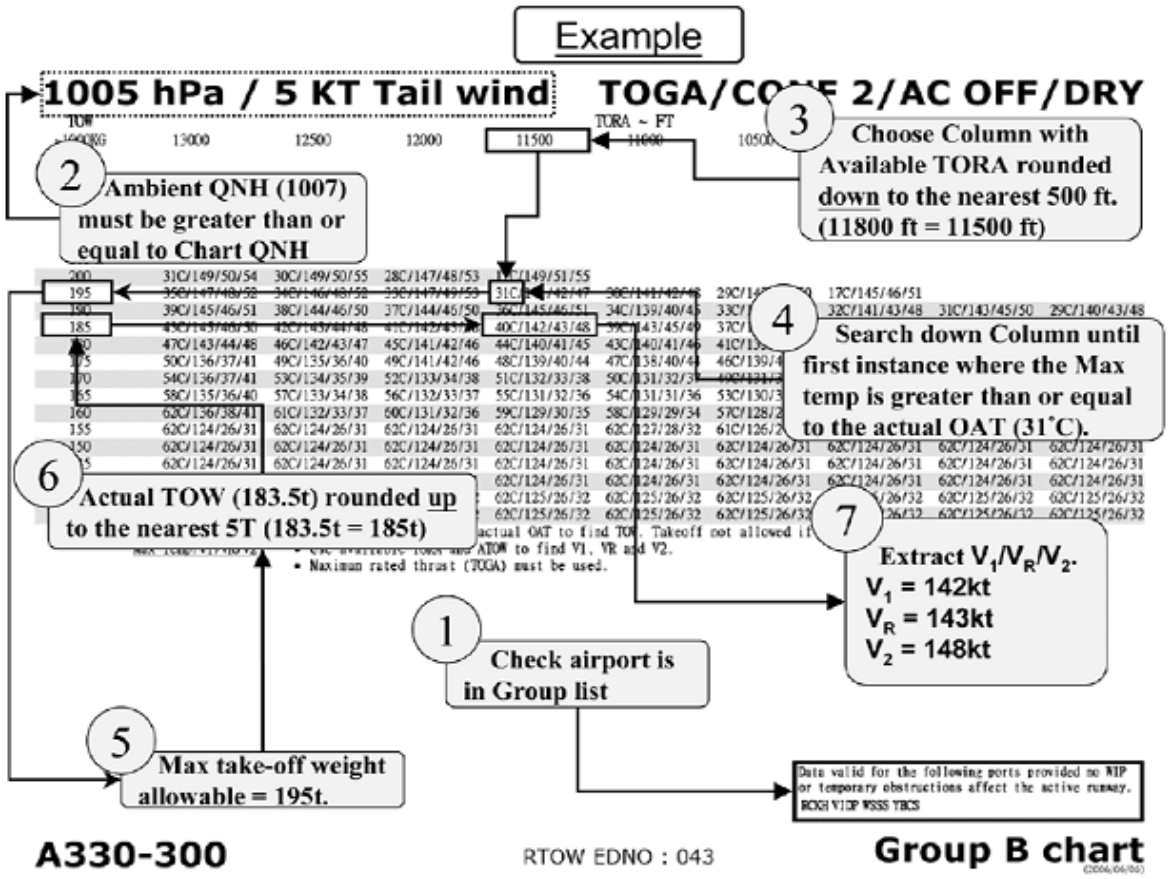


2.4.2 TAKEOFF WEIGHT CALCULATION

1. Determine Available TORA by checking Jeppesen "Additional Runway Information" (usually Page 10-9A) - "TAKE-OFF" Column. If no data is displayed in this column, use the runway length value from the Airport Plan View chart (usually 10-9).
2. If the airport is not in Group A, check if the Group B chart is valid. If not, check if a Dedicated Simplified RTOW chart is available.
3. For method of calculation, refer to Example Chart.

   Example Data:

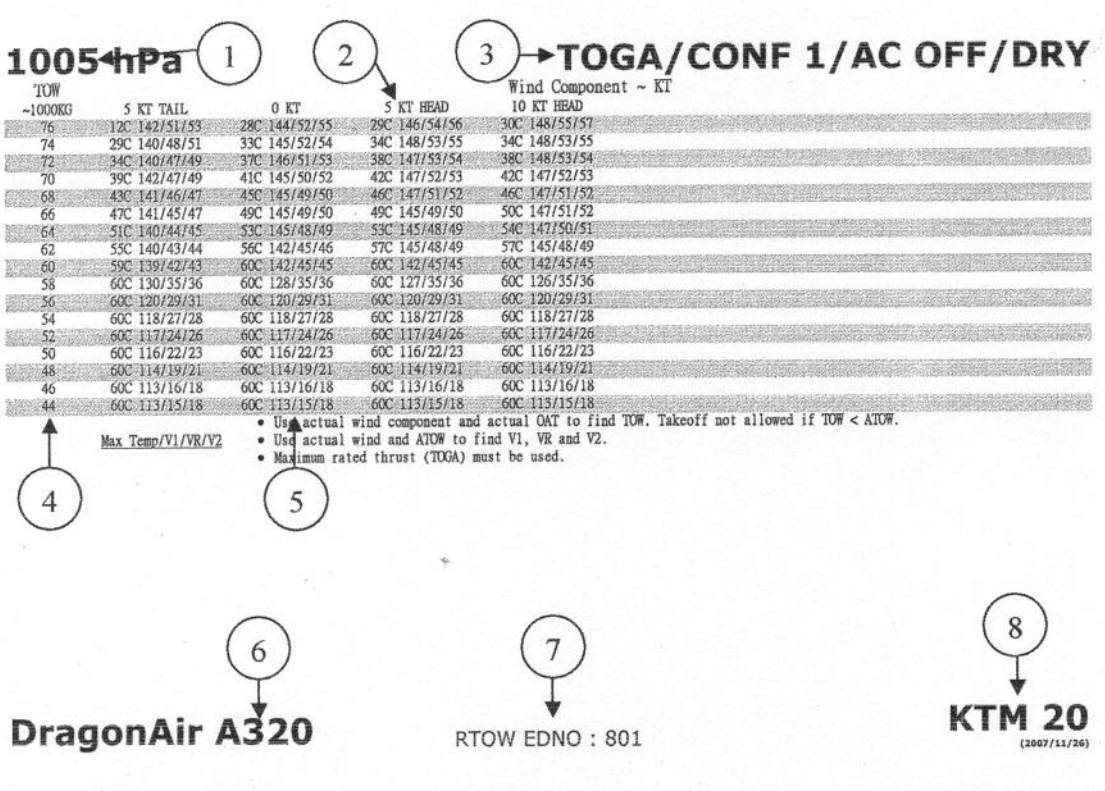
   - QNH = 1007
   - Wind = 2 KT TWC
   - OAT = 31 °C
   - Runway surface = DRY
   - Available TORA = 11,800 FT (round down to next 500 FT)
   - Actual TOW 183.5t (round up to next published weight)



2.5 DEDICATED SIMPLIFIED RTOW CHARTS

2.5.1 CHART GLOSSARY

1. Minimum QNH.
2. Wind component.
3. Takeoff configuration and surface conditions.
4. Takeoff Weight in units of 1000KG.
5. Maximum allowable ambient temperature/V1/VR/V2 for the Takeoff Weight and wind component.
6. Aircraft Type.
7. Edition number of the chart - to be entered in the ACARS CAR.
8. Airport and runway label.

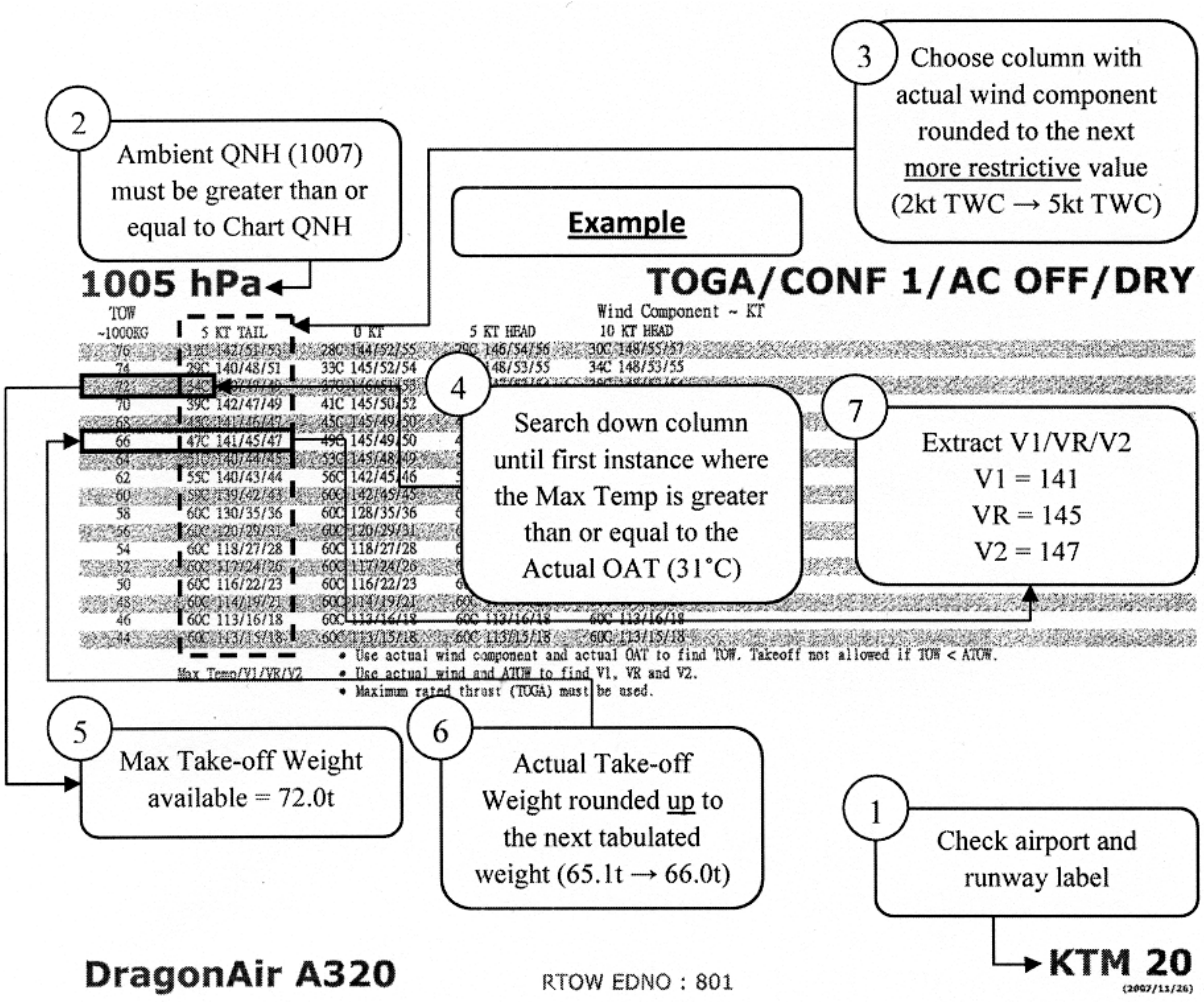


2.5.2 TAKEOFF WEIGHT CALCULATION

1. Check the airport and runway label.
2. For method of calculation, refer to Example Chart.

   Example Data:

   - QNH = 1007
   - Wind = 2 KT TWC
   - OAT = 31 °C
   - Runway surface = DRY
   - Actual TOW 65.1t (round up to next published weight)



2.6 SIMPLIFIED RTOW DATA CHECKING AND RECORDING

1. Simplified Take-off data may be calculated after receipt of the final ZFW.
2. Both crewmembers shall independently calculate the takeoff Data.
3. Data to be used for take-off shall be recorded on the Take-off Data form (or on CFP page 2 if no forms are available). Record the actual TOW rounded up to the next tabulated weight in the WEIGHT RANGE field on the form (e.g. ATOW 183.5 => record 185.0, ATOW 70.0 => record 70.0, etc).
4. Both crew members shall independently check the data entered on the form.
5. Take-off data shall be checked, validated and inserted in the MCDU PERF TO page in accordance with normal procedures for an ACARS RTOW printout. Volume 9.1.2, section 1.6 refers.

   Note: Simplified Take-off data does not provide an “allowable weight band”. If loadsheet TOW exceeds the ATOW on the Take-off Data form rounded up to the next published weight, new data shall be calculated.
6. Insert Chart EDNO in the ACARS CAR.

Sample Take-off Data Form

(Reverse side: Web-RTOW Data Form)

TAKE-OFF DATA FORM

☐SMS / ☐SIMPLIFIED CHART / ☐PRINTER INOP

A/C REG B-..... KA..... DATE..... EDNO.....
PORT.....
TEMP..... .....HPA WIND..... RWY COND.....

AC: ON / OFF ENG / WING / ALL ANTI-ICE: ON / OFF
MEL / CDL / SP OPS .....
.....

FZFW .....
+ T/O FUEL .....

= ATOW ..... WEIGHT RANGE (..... - .....)

V1..... (VMIN.....) RWY.....
VR.....
V2..... CONF.....
TOGA / FLEX.....

EO ACC ..... AAL

SUPPLEMENTARY:
RTOW..... CONF..... TOGA / FLEX.....

INTENTIONALLY BLANK

9.1.3 TAKEOFF PROCEDURES FOR ALL ENGINE AND ENGINE INOPERATIVE OPERATIONS

1. PROCEDURE

Normal takeoff procedure for Dragonair aircraft is to follow published SIDs. SIDs are published by the airport authority and are intended for all engine operations. When there is an engine failure, there is no requirement to adhere to or meet the SID altitude or gradient requirements. However, from an operational perspective it is desirable to maintain the SID lateral track if possible during an engine failure.

Occasionally, an alternative procedure will be necessary to avoid critical terrain in order to be able to uplift typical weights from some airfields. This procedure is called an Engine Inoperative Procedure.

Takeoff procedures for all engine and engine inoperative operations are provided on the "Departures" section of the Port Page. If no specific guidance is provided, any published SID procedure is acceptable for use. Alternatively, where obstacles are too limiting, an engine inoperative procedure will be published on the port page and must be followed to avoid the obstacles during an engine failure.

If visual, or above MSA, or under RADAR CONTROL, then it is permissible to depart from these procedures provided that obstacle clearance can be assured. This applies to all Engine Inoperative Procedures.

For all departures, ACARS RTOW performance data is only valid if the relevant SID or Engine Inoperative procedure is flown.

2. ALL ENGINE TAKEOFF

The local airport authority publishes SIDs in order to control the flow of air traffic departing from particular runways after takeoff. In constructing the SID, the airport authority may require minimum climb gradients or minimum altitudes at certain points along the SID flight path. This can be due to:

1. Geographical terrain. Minimum gradients are used to ensure a safe margin of terrain clearance during takeoff.
2. Minimum Altitude constraints to manage the flow of traffic arriving and departing within the aerodrome.
3. Other ATC purposes, such as noise abatement procedures.

Normally, all engine performance will be sufficient to achieve most airport SID gradient requirements. When certain SID gradients are not achievable for MTOW operations, then some restrictions may apply (e.g. increased flap retraction altitude, limited take-off weight, etc), and a special note will be published for crew guidance.

3. ENGINE INOPERATIVE CONTINUED TAKEOFF

During a continued takeoff with an engine inoperative, the standard procedure is to follow the published SID based on the lateral profile requirement only. Where there is insufficient information provided for lateral profile navigation, then the SID vertical profile information will then be used (e.g. climb gradients, turn at a certain altitude, etc.). RTOW performance data will be based on the most critical obstacles. Where obstacles are too limiting, an engine inoperative procedure will be published in the port page to avoid the obstacle after an engine failure.

In the event of an engine inoperative takeoff, crews will fly the SID or Engine Inoperative procedure as published on the Port Page. In the case where an engine inoperative procedure is to fly a SID, provided the SID is programmed in the FMS, use of managed lateral NAV modes is recommended.

Standard terminology on the Port Page refers to Engine Inoperative Flap Retraction Altitude expressed in feet AAL and AMSL.

Engine Inoperative Flap Retraction Altitudes will only be published on the Port Page if they are higher than the standard figures. For cold weather operations, ISA –15°C and below, ACARS RTOW will automatically increase the Engine Inoperative Flap Retraction Altitude.

For Dragonair operations, standard minimum Engine Inoperative Flap Retraction Altitude is:

- Airbus 1500 ft AAL
- Boeing 1000 ft AAL

Obstacle analysis is separated into two categories: close-in obstacles and distant obstacles.

Close-in obstacles consider the SID track within the 25nm MSA radius with:

- Track width +/-900m of centerline
- 35ft minimum obstacle clearance with net performance (50ft in a turn)
- 15° angle of bank

Distant obstacles consider the SID track beyond the 25nm MSA radius (if required) with:

- Track width +/-5nm of centerline
- 2000ft minimum obstacle clearance with net performance

If an engine failure occurs during a FLEX takeoff, consider increasing to TOGA thrust once airborne.

EGPWS warnings may occur due to close proximity to terrain. Additionally, GPWS warnings may be triggered by Rad Alt rate of closure at heavy weights. If this occurs, follow the GPWS procedure as per the QRH, being careful to respect Vmca.

4. ENGINE INOPERATIVE MISSED APPROACH

The standard procedure for an engine inoperative missed approach is to follow the published missed approach procedure. If obstacles under the track are considered to be critical, then an engine inoperative missed approach procedure will be published in the "Arrivals" section of the Port Page.

Engine inoperative missed approach performance is only considered up to the Maximum Landing Weight. However, landings at weights up to the RTOW can safely follow the engine inoperative departure procedure.

Missed Approach performance is based on the average minimum and maximum temperatures for each port. Temperature correction to the acceleration altitude is not required.

5. STANDARD ENGINE INOPERATIVE OPERATING PROCEDURES

Engine Inoperative Takeoff (Departures Section of Port Page)

1. Follow the Engine Inoperative Departure procedure.
2. If no Engine Inoperative Departure procedure is published, follow any permissible SID.

Engine Inoperative Missed Approach (Arrivals Section of Port Page)

- **Less Than MLW**
  1. If no Engine Inoperative Missed Approach procedure is published, follow the standard missed approach.
- **Greater Than MLW**
  1. Follow the Engine Inoperative Departure procedure.
  2. If no Engine Inoperative Departure procedure is published, follow any permissible SID.

6. ENGINE INOPERATIVE PROCEDURES - EXAMPLES

There are six basic types of engine inoperative scenario for both take-off and missed approach. Some of them are no more than a non-standard flap retraction altitude or give an additional instruction while following a SID.

1. Non-Standard Minimum Flap Retraction Altitude

Flap Retraction Altitude 2,100FT AAL (2,300FT AMSL)

Decode: Follow the normal SID, but commence the acceleration segment at a non-standard altitude 2,300ft AMSL.

2. Turn to a specific point (navaid, airport) before reaching a designated point (DME distance, initial turn)

Engine inoperative before D17 PEK VOR

Turn back to PEK VOR and hold at or above MSA

Decode: In this case, the turn direction is at the pilot's discretion, although it may be specified. No turns below 500FT AAL (KA policy). If an engine failure occurs at or anytime after V1 it is safe to continue as far as D17 PEK on the SID. Think of D17 PEK VOR as the limit.

Note: Airmanship will dictate when and in which direction to turn back toward the airport within the D17 PEK. It should not be necessary to turn back at 500FT. Normally the turn would be initiated after the aircraft is clean and climbing toward MSA (4th segment).

3. Turn onto a specified track at a designated point

Engine inoperative before PORPA:

Continue to D8.0 ISR, then turn RIGHT onto track 190º. Max 220 knots until established on track 190º or above 2,500ft AAL (2,500ft AMSL).

Decode: D8.0 ISR must be overflown before the turn is commenced. The turn is onto a specific track (with a speed limit).

Note: With Green Dot above 220 kts, Flap 1 must be kept until final acceleration, i.e. tracking 190 or above 2,500ft.

4. Continue on SID to a designated point then turn or hold

Follow SID until D20 DGC VOR then turn RIGHT and track 240, climbing to5,000FT AAL (5,100FT AMSL)

Decode: D20 DGC VOR must be over flown before turn is commenced.

5. Maintain runway track to a specified distance then turn

Engine inoperative before Initial Turn:

Continue on runway track until D6.0 TAJ VOR, then turn EAST to TAJ VOR.

Decode: After over flying D6.0 TAJ VOR, turn in the specified direction to the designated point.

Note: In this case track must be maintained until the D6 point.

6. Continue on SID to reach specified altitude by a specified distance

Continue on SID and climb to 6,200FT AAL (6,300FT AMSL) by D48 SK NDB. If unable to comply, advise ATC and return to SK NDB and hold at or above MSA.

Decode: Monitor climb performance whilst continuing on the SID. If at any point before the specified distance it appears that the required altitude will not be met, advise ATC and turn back to the specified point.

Note: ACARS RTOW performance is based on ambient conditions to the end of the 2nd segment, thereafter performance analysis uses standard data. Therefore, at heavy weight and hot temperatures the required altitude may not be achievable, hence the 'if unable to comply'. There are a number of airports where this instruction forms part of the procedure and usually refers to maintaining 2,000ft obstacle clearance within 5nm of the SID track once outside the 25nm MSA. The preferred action would usually be a return to the departure airfield, however if routing to a takeoff alternate it would be necessary to achieve the required altitude unless under radar control and terrain separation is assured.

9.1.4 TAKEOFF IN OTHER CONDITIONS

Takeoff performance may be adversely affected by wet or contaminated runways, or aircraft unserviceability (e.g. thrust reverser, spoiler, or brake unit inoperative).

1. THRUST REVERSE PERFORMANCE CREDIT

When thrust reverse credit is applied, ACARS RTOW assumes the application of maximum reverse thrust during a RTO deceleration.

Thrust reverse credit is applied as below:

- Dry Rwy — Thrust reverse credit not applied. If used during RTO it will provide a performance benefit.
- Wet / Contaminated Rwy — Thrust reverse credit applied, unless listed as unserviceable during initial ACARS RTOW performance request.

2. WET AND CONTAMINATED RUNWAY

A wet/contaminated runway is defined in FCOM 2.04

The regulations for takeoff on a wet/contaminated runway require full credit to be taken for thrust reversers and the screen height to be reduced from the dry runway screen height of 35ft to not less than 15ft. This allows a lower V1 in order to improve the chance of stopping on a wet/contaminated runway.

Thrust reversers are not required for dispatch on wet/contaminated runways. However, if available, full reverse thrust must be used when rejecting take-off on a wet/contaminated runway.

The wet/contaminated performance tables detailed in FCOM 2.04.10 are not to be used for Dragonair operations. ACARS RTOW and the associated backup is the only authorized method for performance calculation. Actual runway surface conditions should be entered directly into the program. Provided takeoff performance can be computed using ACARS RTOW, dispatch with the specified wet/contaminated runway conditions is permitted. However, the reduced cross-wind tables listed in FCOM 2.04.10 must still be observed.

3. PERFORMANCE RELATED FAILURES

Dispatch with up to two aircraft performance defects may be permitted on dry, wet, or contaminated runways. In most cases, reductions will be required to the performance limited takeoff weight (MTOW), V speeds or both. This will be done automatically within the ACARS RTOW system. Provided takeoff performance can be computed using ACARS RTOW, dispatch with single or multiple failures, for the specified runway condition, is permitted. Additionally, ACARS RTOW, WEB RTOW and SMS RTOW are the only authorized method for takeoff performance calculation with performance defects. Simplified RTOW Charts are valid for use with reversers inoperative. Refer to aircraft MEL for specific defect items.

Defects within the Configuration Deviation List (CDL), which affect takeoff performance, can also be considered directly through ACARS RTOW. One CDL item only can be entered directly as a corresponding ATA code into the takeoff performance request.

TABLE OF CONTENT

INTENTIONALLY BLANK

9.2. ENROUTE PERFORMANCE

9.2.1 COST INDEX

Refer to PartA 8.1.6.

INTENTIONALLY BLANK

TABLE OF CONTENT

INTENTIONALLY BLANK

9.3. LANDING PERFORMANCE

9.3.1 GENERAL

1. APPROACH CLIMB REQUIREMENT

The approach climb gradient requirement of 2.1% (2.5% for a CAT II approach) must be satisfied with one engine inoperative, gear up and flaps partially retracted from the landing configuration. This requirement allows the approach climb with Flaps 3 for a Flaps Full landing and Flaps 2 for a Flaps 3 landing.

The approach climb limits are shown in FCOM/PER-GOA-ACG. The approach climb is rarely limiting up to the maximum landing weight.

2. LANDING CLIMB REQUIREMENT

The landing climb gradient requirement of 3.2 % must be satisfied with landing flaps and gear down and all engines at maximum thrust. Landing climb is not limiting for a two engined aircraft.

3. LANDING DISTANCE AVAILABLE (LDA)

LDA is the length of runway declared to be available and suitable for landing. LDA starts at the threshold and, in most cases, corresponds to the physical length of the runway. However if the threshold is displaced, the LDA is reduced and will normally be the distance between the displaced threshold and the far end of the runway.

4. LANDING DISTANCE REQUIRED (LDR)

LDR is the demonstrated landing distance plus additional factoring. The demonstrated landing distance is from a point 50 ft over the threshold to the end of the landing roll using brakes and spoilers but not reverse thrust. The actual landing distances are shown in FCOM/PER-LDG-ILD.

The demonstrated dry runway landing distance is divided by 0.6 (ie multiplied by 1.67) to determine the LDR for a dry runway and a further 15% is added (i.e. multiplied by 1.92) to determine the LDR for a wet runway. The factored dry runway landing distances are shown in FCOM/PER-LDG-DIS.

For a contaminated runway, the LDR is the greater of the wet runway LDR and 115% of the demonstrated landing distance for the contaminated conditions.

While a comfortable margin exists on a dry runway and even a good margin on a wet runway, the margin on a contaminated runway may be relatively small.

The effect of thrust reversers should not be included in landing distance calculations.

5. REGULATED LANDING WEIGHT (RLW)

RLW is the lesser of the performance limited landing weight, calculated from the considerations above, and the maximum structural landing weight.

6. CLIMB GRADIENTS

Refer Part A 8.3.3.4.

7. DISPATCH LANDING PERFORMANCE

At the pre-flight stage, it is a legal requirement that the landing distance required (LDR) does not exceed the available landing distance (LDA) at both the destination and alternate airports. When calculating the most limiting LDR for each airport, the following shall be considered:

- the most suitable runway for landing in still air conditions, and
- the runway that may be required for landing due to the forecast wind conditions.

Dispatch Landing Performance shall be checked in the following cases:

- when dispatching to an unplanned destination
- where LDA is affected by WIP, or
- where landing performance is affected by system degradation (refer MEL/DDG).

The following may be used to check dispatch landing performance:

- ACARS LANDING (data is appended to the bottom of the printout), or
- REQUIRED LANDING DISTANCE tables. FCOM/PER-LDG-DIS refers.

8. INFLIGHT LANDING PERFORMANCE

Landing performance must be considered prior to every approach. FCOM/PRO-NOR-SOP-16 refers.

Landing performance may be calculated using:

- ACARS LANDING, or
- Landing performance tables in QRH/FPE-IFL.

9. OPERATIONAL LANDING DISTANCE (OLD)

ACARS LANDING data is based on Operational Landing Distance. OLD is the result of industry and regulatory initiatives to apply additive factors onto the baseline performance so as to provide the maximum landing performance realistically achievable by a line pilot adhering to standard techniques. The following section defines those additives.

9.3.2 ACARS LANDING

1. ACARS LANDING GUIDE

1.1 INTRODUCTION

ACARS LANDING operates in a similar way to ACARS RTOW. After all the required data has been entered and sent, the computed data is returned to the flight deck as a printable, on-screen display, via the "Received Messages" prompt. All entered data will remain on the screen to facilitate multiple requests. All fields are reset to their default values after landing.

There are two distinct sets of landing performance data with distinct requirements:

- DISPATCH LANDING PERFORMANCE data, and
- INFLIGHT LANDING PERFORMANCE data

DISPATCH LANDING PERFORMANCE data is manufacturer provided and certified data which is used to check compliance with legal Dispatch Landing Performance requirements. A Maximum Landing Weight and flap setting are provided.

- 50% of Headwind or 150% of Tailwind component
- Maximum Manual Braking
- No credit for reverse thrust usage
- ISA conditions
- Zero runway slope

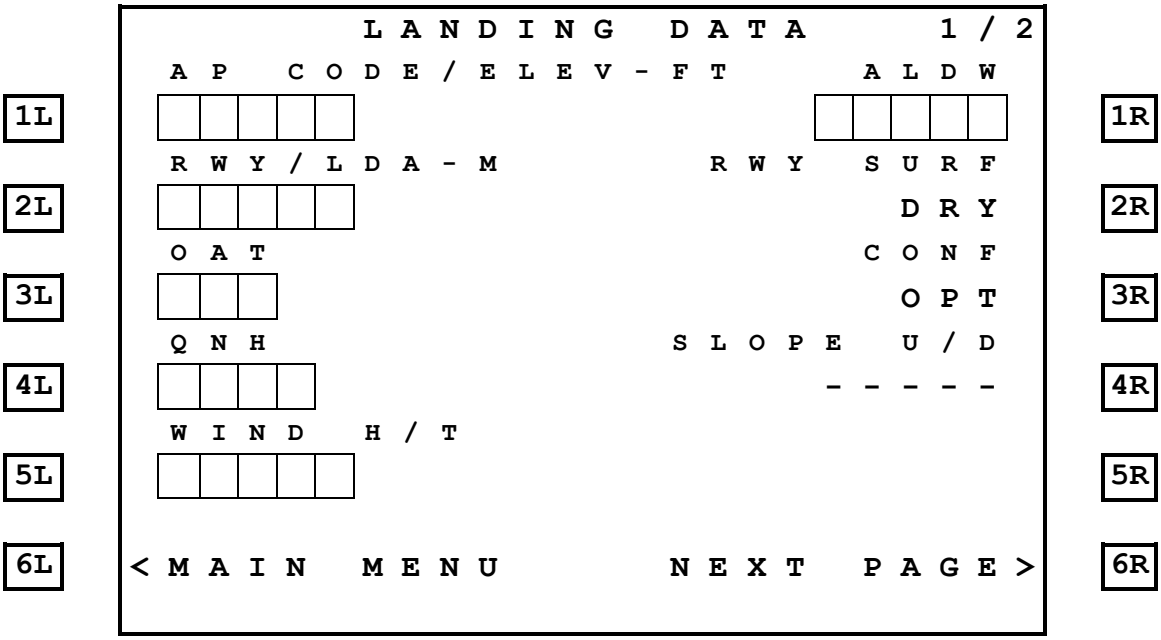
INFLIGHT LANDING PERFORMANCE data is manufacturer supplied operational data used to conduct an inflight assessment of Landing Performance. The default data provided by ACARS LANDING for inflight assessment assumes:

- Crossing the threshold at 50 FT
- No credit for reverse thrust usage
- Auto thrust engaged
- Touchdown at not less than 1,500 FT from threshold
- Manual landing

The horizontal distance from the threshold to where the aircraft comes to a complete stop is presented as the Operational Landing Distance (OLD). It is then further increased by a factor of 1.15 for normal operations to give the Factored Operational Landing Distance (FOLD).

In case of a PADD or inflight failure the OLD is multiplied by the corresponding failure factor(s) to give OLD with Failure (OLDxF)

ACARS LANDING DATA 1/2



AP CODE/ELEV-FT — Enter ICAO or IATA landing airport code (e.g. VHHH or HKG) or airport elevation in feet. Data is only available for online ports and corresponding alternate airports. Enter airport elevation and landing distance if it is not available in the database.

RWY/LDA-M — Enter RWY Code or landing distance available in metres (e.g. 07L or 3000), or enter "ALL" for a list of runway codes.

Note: *Runways in the ACARS LANDING database assume FULL length for landing-performance calculations. The runway code is the same as the runway designator, e.g. 07R. If less than full length is desired, enter a LDA value instead.*

WARNING: ***NOTAMs for landing distance WIP will not be monitored by OPS ENG section. WIP landing data is not available in the database.***

OAT — Enter airport OAT in degrees Celsius e.g. +10 or -5.

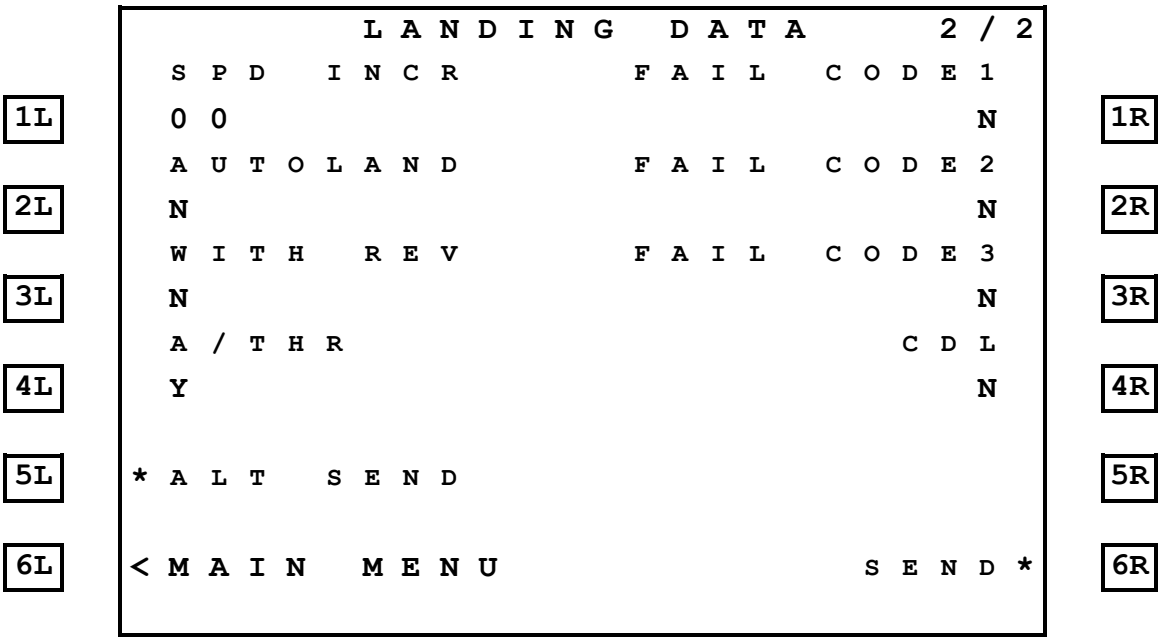
QNH — Enter airport QNH in hPa e.g. 950, 1040 etc.

WIND H/T — Enter surface wind in Head or Tail component in KT e.g. 10H or 5T.

ALDW — Enter expected landing weight in tonnes e.g. 182.5.

RWY SURF	Default is DRY. Available options are: • DRY for Dry • WET for Wet • WT6 for Standing Water 6mm(1/4") • WT12 for Standing Water 12mm(1/2") • SH6 for Slush 6mm(1/4") • SH12 for Slush 12mm(1/2") • CSNW for Compact Snow • ICE for ICE
CONF	Default is OPT. Other options are 1, 2, 3 and FULL.
SLOPE U/D	When airport elevation is entered instead of the ICAO or IATA airport code, input the runway slope in percentage, e.g. "0.02U" represents 0.02% uphill; "0.15D" represents 0.15% downhill etc. *Note : If ICAO or IATA airport code is entered, the slope input will be ignored. If a distance is entered instead of a runway code (e.g. as with WIP), then the system will assume the most penalising slope at the airport.*

ACARS LANDING DATA PAGE 2/2



SPD INCR — Speed increment. Default is zero; discretionary increases to Vapp/Vls should be entered here, e.g. windshear/local conditions.

AUTOLAND — Default is "N" for manual land. Other option is "Y" for Autoland.

WITH REV — Displays "N" as the default, i.e. no reverse thrust credit. Enter "Y" to enable the reverse thrust credit.

Note: For DRY runway operations (without a failure), reverse thrust credit is never taken and the returned parameters will be identical regardless of the selection of "Y" or "N".

A/THR — Displays "Y" as the default with 5kt Vapp correction, i.e. Auto Thrust active. Enter "N" if manual thrust is planned.

Note: "N" assumes the approach will be flown at Vls, unless a value is entered in "SPD INCR" or there is a system failure that requires a ΔVref.

FAIL CODE 1 — Default "N" for no failure. Enter the failure code as per MEL/DDG for dispatch or QRH for inflight failure, e.g. enter "ELEC1".

FAIL CODE 2 — As per FAIL CODE 1

FAIL CODE 3 — As per FAIL CODE 1

CDL	Displays "N" as the default for no CDL item. Enter a CDL code or weight reduction (e.g. 2000 for a 2 tonne penalty) in accordance with the MEL/DDG.
ALT SEND	When available, provides an alternative communication path in the event of ground mainframe failure. Expect a slow response.

1.2 ACARS LANDING OUTPUT

The computed landing data is returned to the MCDU screen. The message is divided into three parts.

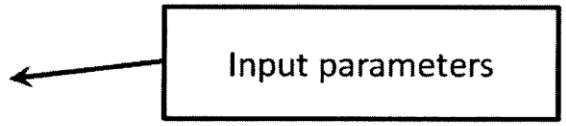
The first part is a summary of the input parameters (and warning message if any) for verification purposes.

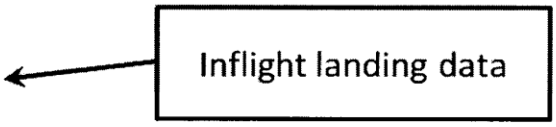
The second part is the inflight landing data, which includes the CONF setting, threshold crossing speed, and landing distances for different brake settings.

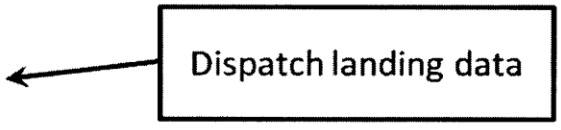
The third part is the dispatch landing data (regulatory requirement), which contains the maximum allowable landing weight for the given conditions and the associated configuration setting. Dispatch landing data is only available for normal and failure(s) as listed in MEL/DDG (i.e. not available for inflight failure).

Example 1: Normal ACARS LANDING Output

```
B-HLB   KA1234    07SEP10
VMMC:MFM 16      EDNO 8UU
LDA :  9400FT /  2865M
+20C 1013HPA  0HEAD  DRY
MAN LAND         CONF OPT
NO REV           A/THR ON

------A330-342 T772-----
OPERATIONAL LDG DATA:
ALW 182.0

LANDING CONF: FULL

VLS       135
APP COR     5
SPD INCR    0
VAPP      140

BRK SETTINGS   FOLD(FT/M)
MANUAL        4826 / 1471
MED           6513 / 1985
LOW           8483 / 2586
------A330-342 T772-----
DISPATCH REQUIREMENT:
MLW 246.0   CONF FULL
```







Example 2: ACARS LANDING with Inflight FAILURE or PADD

```
B-HLB   KA1234   07SEP10 --- Line 1
VMMC:MFM 16     EDNO 9QT --- Line 2
LDA :  9400FT /  2865M   --- Line 3
+20C 1013HPA  0HEAD  DRY --- Line 4
MAN LAND        CONF OPT --- Line 5
NO REV          A/THR ON --- Line 6
FAIL CODE:
FCTL14  1 PAIR SPLR      --- Line 7

------A330-342 T772-----
OPERATIONAL LDG DATA:
ALW  182.0               --- Line 8

LANDING CONF: FULL       --- Line 9
VREF     135             --- Line 10
DVREF      0             --- Line 11
APP COR    5             --- Line 12
SPD INCR   0             --- Line 13
VAPP     140             --- Line 14

OLD W/O AUTOBRK   1230M  ]
F/CTL14 Dist Fact  1.20  |-- Field 15
A/THR ON Factor    1.20  |
Final Factor       1.44  ]

BRK          OLDxF (FT/M)
MANUAL       6683 / 2037 ]
MED            NO DATA   |-- Field 16
LOW            NO DATA   ]
------A330-342 T772-----
DISPATCH REQUIREMENT:
MLW 246.0  CONF FULL     --- Line 17
```

INFORMATION PROVIDED ON ACARS LANDING OUTPUT

Line 1 Aircraft Registration Number, Flight Number and Date.

Line 2 Arrival port in ICAO and IATA code or elevation in feet, runway code (if available) and Edition number.

Line 3 Landing distance available.

Line 4 OAT, QNH, wind component and runway surface condition.

Line 5 Autoland setting “MAN LAND” or “AUTO LAND” and input CONF setting.

Line 6 Reverse thrust credit and Auto Thrust setting.

Line 7 Failure note(s) if any.

Line 8 Input actual landing weight in tonnes.

Line 9 Landing CONF setting.

Line 10 Display VLS for no failure. Display VREF with failure entered.

Line 11 VREF increment due to failure(s) if any.

Line 12 Approach correction.

Line 13 Crew input speed increment.

Line 14 Approach speed.

Field 15 Field 15 is for inflight failure or PADD cases only:

- Operational Landing Distance without autobrake (OLD W/O AUTOBRK), with individual LDG DIST or MEL/CDL factors AND the final, resultant LDG DIST factor below, including ice accretion.
- This information is provided to indicate what data and factors were used in the landing distance calculation.

Field 16 FOLD or OLDxF in Feet and Metres:

- Normal Case (no failure):
  Factored Operational Landing Distance (FOLD) will be provided here. The FOLD includes an additional 15% margin over the Operational Landing Distance (OLD). Max Manual braking and MED and LOW autobrake distances are provided.
- With Failure:
  The OLD will be multiplied by the corresponding failure factor(s) to provide the OLDxF. This distance is further compared with the normal case (FOLD) and the longer of the two distances is provided as the final result. If either the "FOLD" or the "OLDxF" landing distance is greater than the available landing distance "RWY TOO SHORT" will be displayed.
- No data is available for MED and LOW autobrake usage with any failure that requires a Δ Vref or application of a failure factor.

Line 17 Maximum Landing Weight and CONF setting for dispatch, with the entered technical and environmental conditions. The data is valid for normal operations and dispatch with PADD/CDL items.

1.3 BACKUP PROCEDURES

If the ACARS system or ground computer fails, use ACARS ALT SEND (if installed).

1.3.1 ALTERNATE SEND (if installed)

An "ALT SEND" button is available in some aircraft, on page 2 of the ACARS LANDING input screen. When a communication failure is caused by the ground mainframe system, e.g. during routine system maintenance, using "ALT SEND" may allow the system to bypass the failure by using a different communication path. "ALT SEND" will not be effective when the communication failure is caused by:

- Aircraft system failure, or
- ACARS signal blackout, or
- Ground system ACARS LANDING calculator malfunction

Note : "ALT SEND" response times can be slow. Avoid multiple "ALT SEND" requests.

INTENTIONALLY BLANK

TABLE OF CONTENT

9.4. ACARS PROCEDURES

9.4.1 GENERAL

All Dragonair aircraft are equipped with functional and operational ACARS systems.

An ACARS interactive training presentation is available on Dragonet.
(refer to Flight Crew Team>Training>Best Practice).

INTENTIONALLY BLANK

9.4.2 ACARS APPLICATIONS

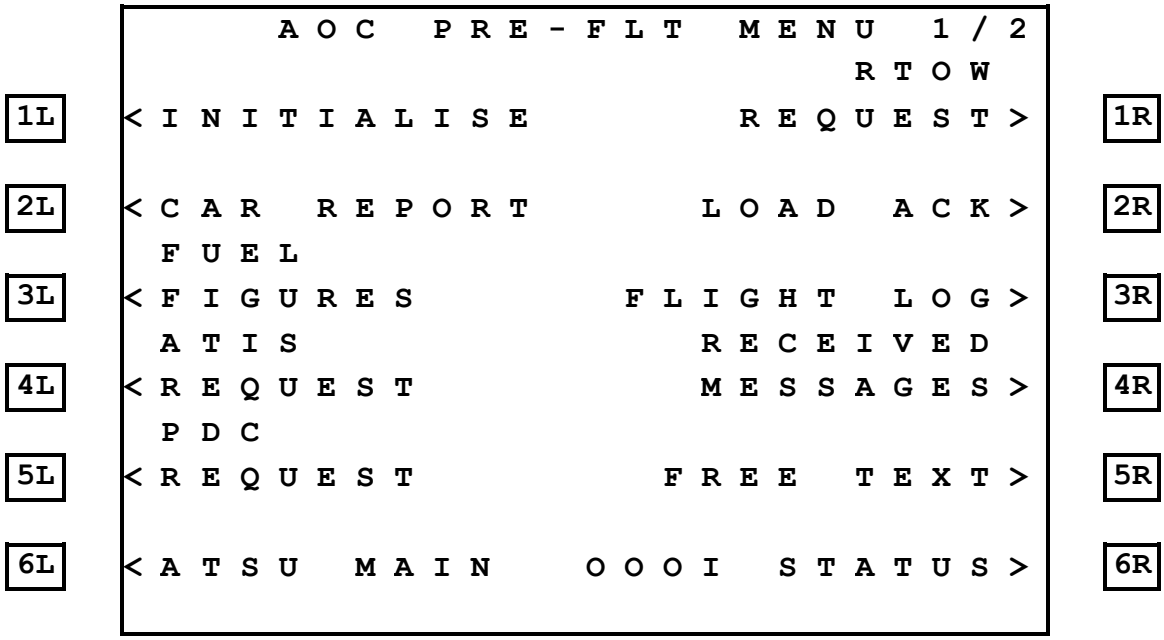
1. ACARS ACROYNMS

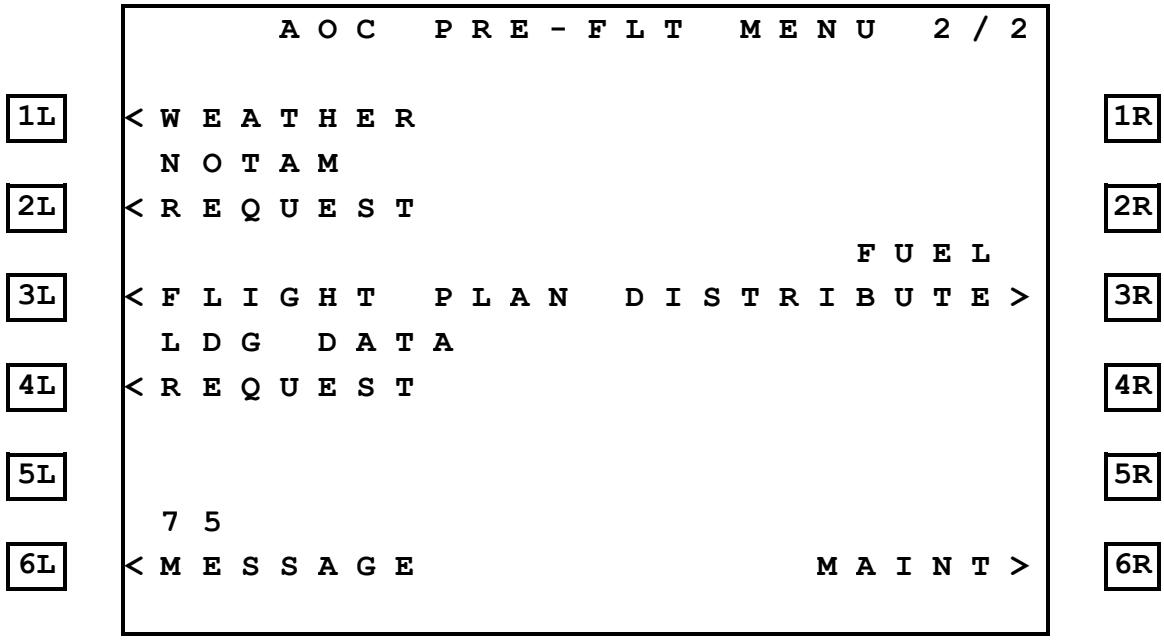
ACARS	Aircraft Communicating, Addressing and Reporting System
AGM	Air Ground Message
AIDS	Aircraft Integrated Data System
AOC	Airline Operational Control
ARINC	Aeronautical Radio Inc
ARN	Aircraft Registration Number
ATSU	Air Traffic Services Unit
DATIS	Digital ATIS
DSP	Datalink Service Provider
MU	Management Unit. A computer utilised to generate and route digital data to/from various aircraft avionics systems and a ground network
OOOI	OUT (Off Blocks), OFF (Takeoff), ON (Landing) and IN (On Blocks)
PDC	Pre-Departure Airways Clearance
SITA	System International Telecommunication Association

2. DRAGONAIR AOC MENU PAGES

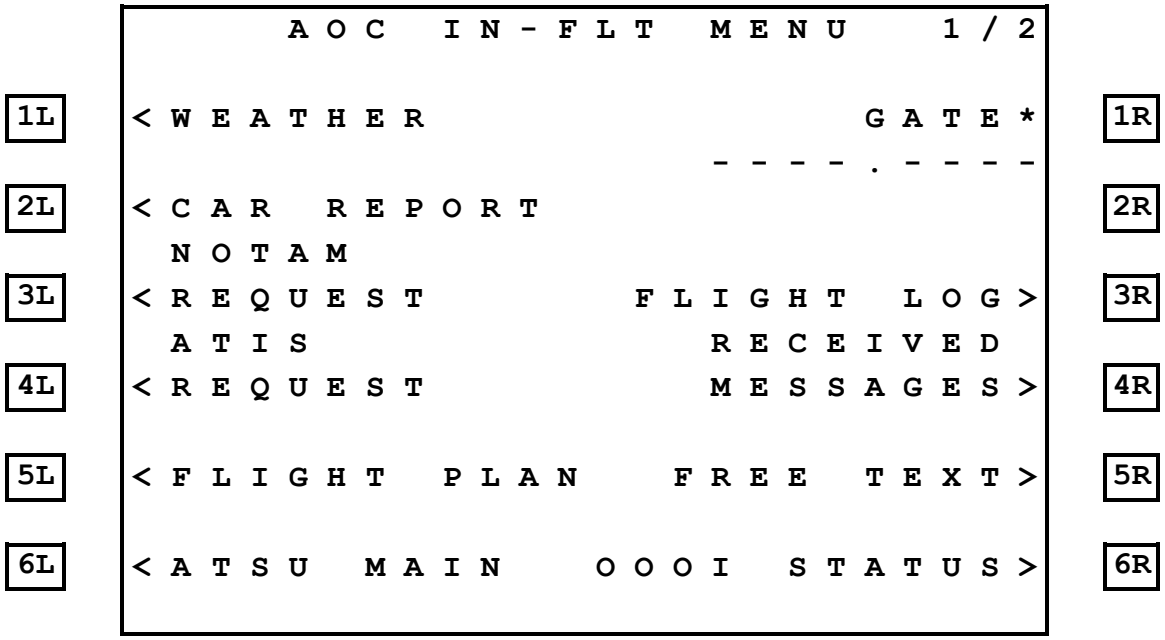
Below are illustrations of AOC menu screens as seen in the aircraft MCDU.

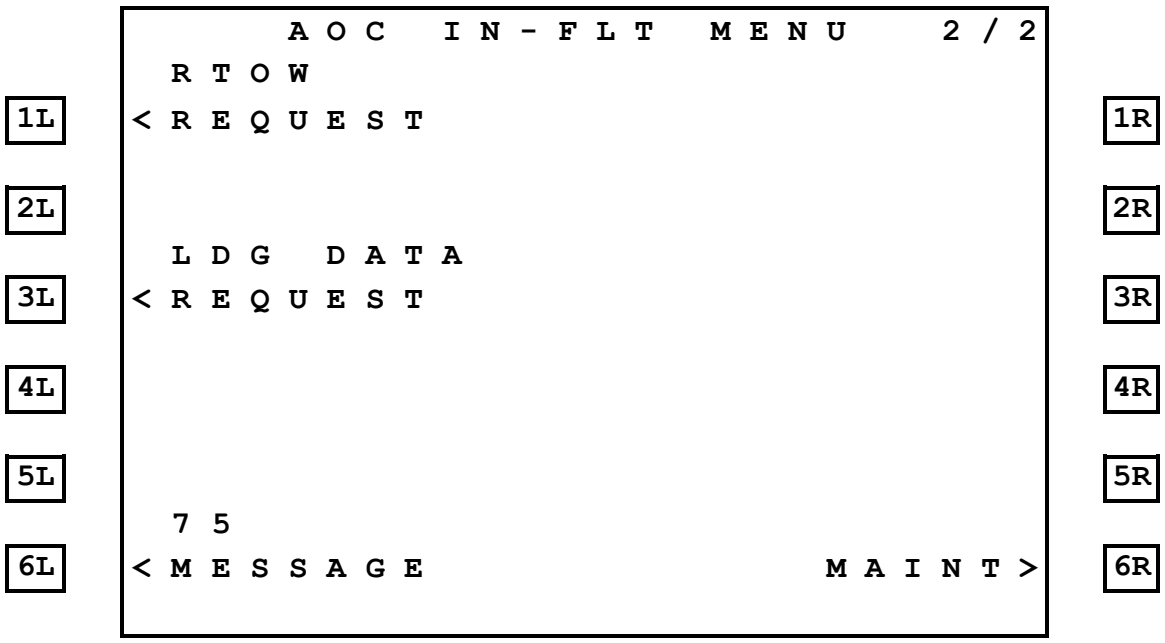
2.1 ACARS PRE-FLT MENU SCREEN



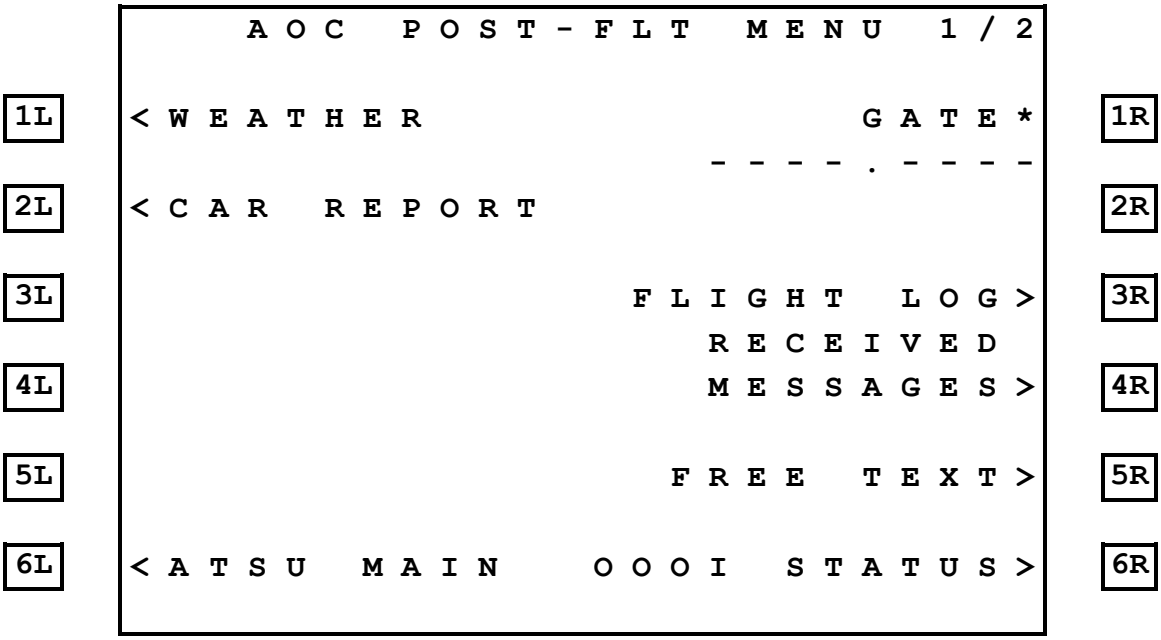


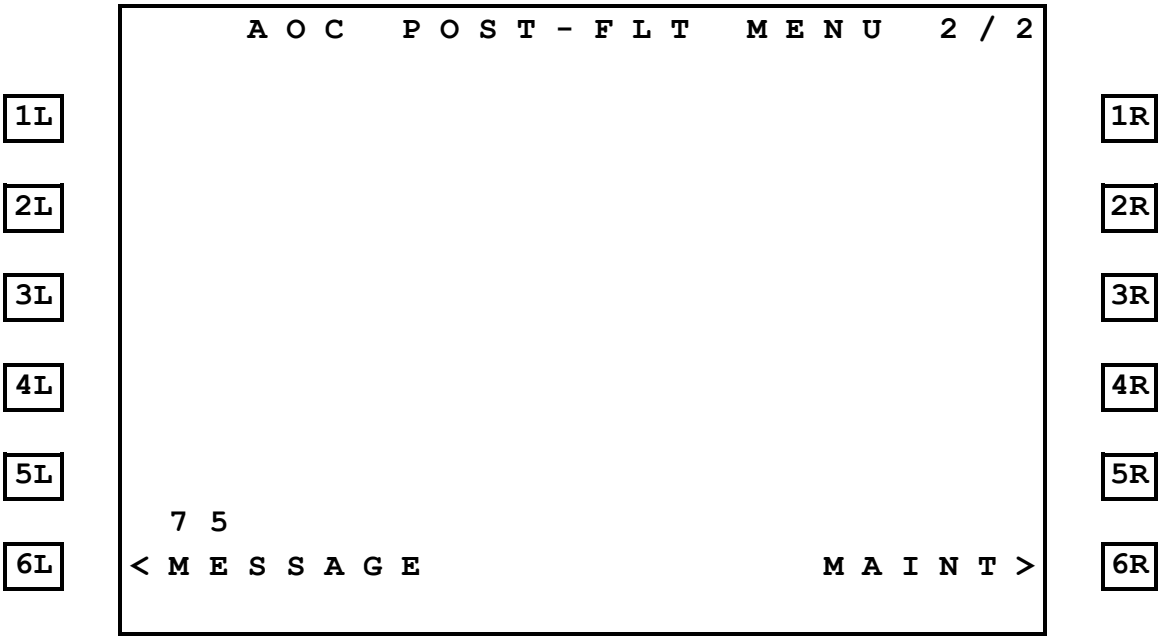
2.2 ACARS IN-FLT MENU SCREEN





2.3 ACARS POST-FLT MENU SCREEN





3. AOC APPLICATIONS SUMMARY

INITIALISE

- Allows the synchronisation of airframe registration (tail number), flight number, and flight crew. Enables flight details to be uplinked from various company applications.

CAR REPORT

- Commander's Administrative Report. During flight used to insert data such as, takeoff & landing ERN, autoland, and ETOPS. This information is then printed at the end of the flight.

FUEL FIGURES

- Summary of fuel figures, used as the basis for loadsheet compilation. Part A chapter 8 refers.

ATIS REQUEST

- Digital ATIS for departure and arrival at airports equipped with D-ATIS.

PDC REQUEST

- Sends a request to the specified ATC unit to receive a pre-departure clearance.

RTOW REQUEST

- Sends a request for ACARS RTOW takeoff performance data.

LDG DATA REQUEST

- Sends a request for ACARS LANDING landing performance data.

LOAD ACK

- Load acknowledgement. Part A chapter 8 refers.

FLIGHT LOG

- Shows real time, off blocks, airborne, landing & on blocks times. During flight OUT, OFF and elapsed times are displayed.

RECEIVED MESSAGES

- Used to view messages received by the aircraft. Some are automatically printed. Others can be read and printed if desired.

FREE TEXT

- Used to send air-ground messages stations that are programmed to receive messages from the aircraft.

OOOI STATUS

- Out, Off, On, In times. Shows details when specific events occurred, such as doors closed.

WEATHER

- Provides flight crew access to actual and forecast weather information to over 4000 stations worldwide.

NOTAM REQUEST

- Not implemented.

FLIGHT PLAN

- Allows for three types of CFP to be requested.

75 MESSAGE

- Hijack alert. When sent this downlink message will alert IOC that a Hijack situation is occurring. Part A chapter 10 refers.

MAINT

- Not for crew use.

GATE*

- Not implemented.

FUEL DISTRIBUTE

- Allows individual tank quantities to be sent to CLC for loadsheet preparation in the event of a non-standard fuel distribution. In this case the normal FUEL FIGURES page should not be used. Part A chapter 8 refers.

9.4.3 ACARS SYSTEMS AND AIRCRAFT EQUIPMENT

The ACARS system is simply a means of communication for the purpose of transferring data. This data can take the form of text messages, weather information, ATC clearances, and engineering reports such as ECM/PFR.

Dragonair ACARS messages are transmitted from aircraft by VHF radio to ground stations provided by Datalink Service Providers such as ARINC and SITA. Messages are then routed via a Front-End-System (CAFES) and delivered to Dragonair using a Telex Network. Two-way communication between aircraft and airline is available within the entire Dragonair network. Messages are stored electronically for a period of 12 months.

1. ACARS SYSTEMS

Presently there are two separate systems in use on KA aircraft, ACARS MU and ATSU.

ACARS MU - This is a generic stand-alone datalink unit and is fitted to early A330 aircraft.

ATSU - This is an integrated communications system developed by Airbus and includes an Airline Operational Control (AOC). It is similar in operation to ACARS MU for datalink communications and is fitted to our A320/321 and later A330 aircraft.

2. EQUIPMENT

ACARS aircraft equipment includes, ECAM, MCDU, RMP, and Printer. Overall control of the equipment is provided by the Management Unit (MU) or Air Traffic Service Unit (ATSU).

ECAM - Provides operational status of the ACARS system and message alerts. FCOM/PRO-ABN refers.

MCDU - The primary interface with ACARS is the MCDU display unit. It is used to select and navigate the ACARS/AOC menu screens.

RMP - RMP3 (where fitted) is primarily intended for ACARS use. ACARS should be in the active window. If ACARS is in the standby window, complete voice communication and press transfer switch.

AIRCRAFT PRINTER

- ACARS uses the aircraft printer, located on the central pedestal, to print hard copy uplink messages, weather information, and reports.

INTENTIONALLY BLANK

9.4.4 OPERATING INSTRUCTIONS

Initialisation and correct use of ACARS is an operational requirement and as such is incorporated in FCOM/PRO-NOR-SOP.

1. DSP FREQUENCIES

Data Service Provider frequencies for Dragonair aircraft:

HSD-HSU, HTD-HTI		HYB-HYF, HLA-HLL		HYG-HYQ, HWF, HWG, HWK	
ARINC ASIA	131.450	ASIA	131.450	ARINCASIA	131.450
AVICOM JAPAN	131.450	KOREA/TWN	131.725	AVICOM-JAPAN	131.450
ARINC KOREA	131.725	N.AMER	130.025	ARINC-KOREA	131.725
ARINC INDIA	131.825	EUR/INDIA	131.825	NEWARINCEU	131.825
SITA EUR/AFR	131.725	MID.EAST	131.475	SITA-EUROPE	131.725

HWH-HWJ			
ARINC ASIA	131.450	ARINC MID EAST	131.450
AVICOM JAPAN	131.450	ARINC EUR/AFR	131.450
ARINC KOREA	131.725	ARINC AUSTRAL	131.725
ARINC INDIA	131.825		

If any other DSP is observed then the VHF3 SCAN MASK must be reactivated by Engineering through Aircraft Maintenance Log entry. Use of DSPs other than those listed above can incur significant costs. For all aircraft except HYG-HYQ, HWF, HWG, HWK, the SCAN MASK is locked.

It is acceptable to manually tune DSPs from the table above, e.g. due to loss of auto-tuning, provided that DSP selection is returned to "AUTO" when the selected DSP is no longer required.

To carry out a full Downlink/Uplink test of the system (normally only required when system operation suspect), type “TEST” on the first line of a FREE TEXT page and press SEND. A successful response proves the integrity of the ACARS system.

2. OOOI TIMES

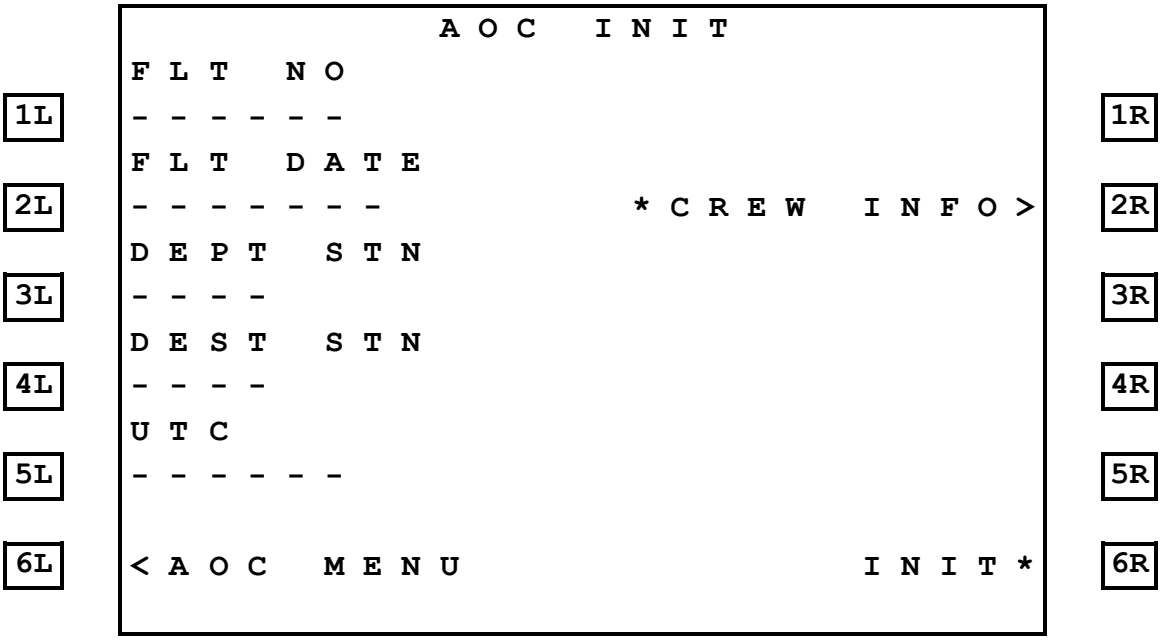
If Block and Flight times are required, they are available on the FLIGHT LOG prompt in the ACARS menu screen.

3. TRANSIT PROCEDURES

During transits, allow at least 10 minutes after the "On Block" time of the previous sector before entering the next sector details into the FMGC Init page. This is to avoid corruption of the previous Sector Summary, which automatically downlinks at ATA +10 minutes. The INITIALISE prompt will appear after the downlink is complete.

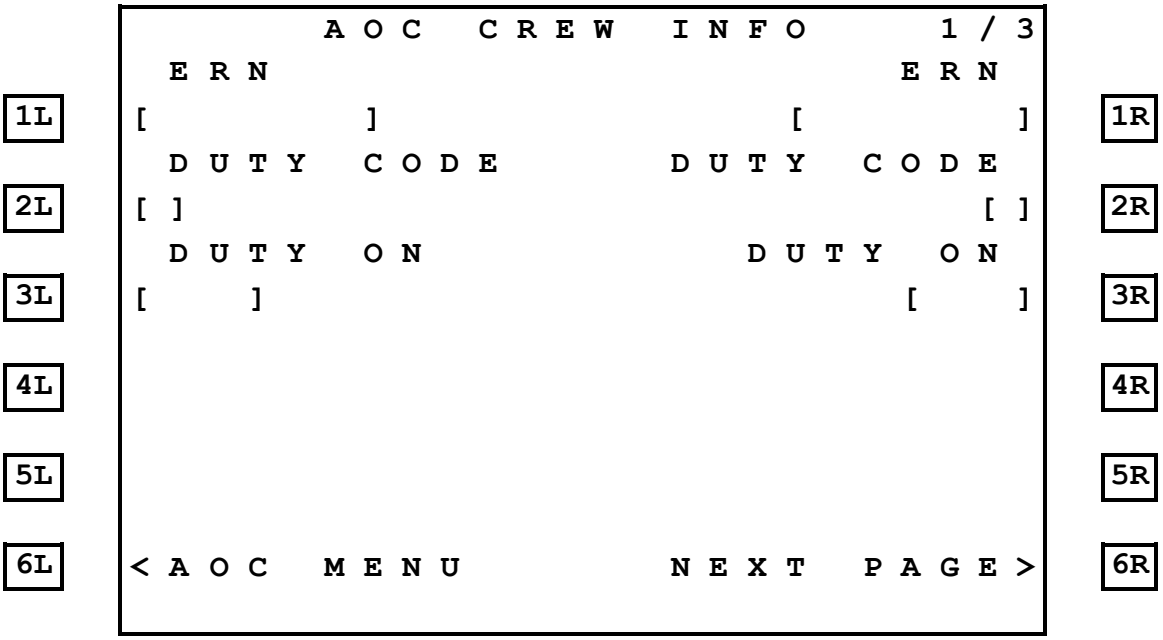
4. COMMANDER'S ADMINISTRATIVE REPORT

4.1 AOC INIT PAGE



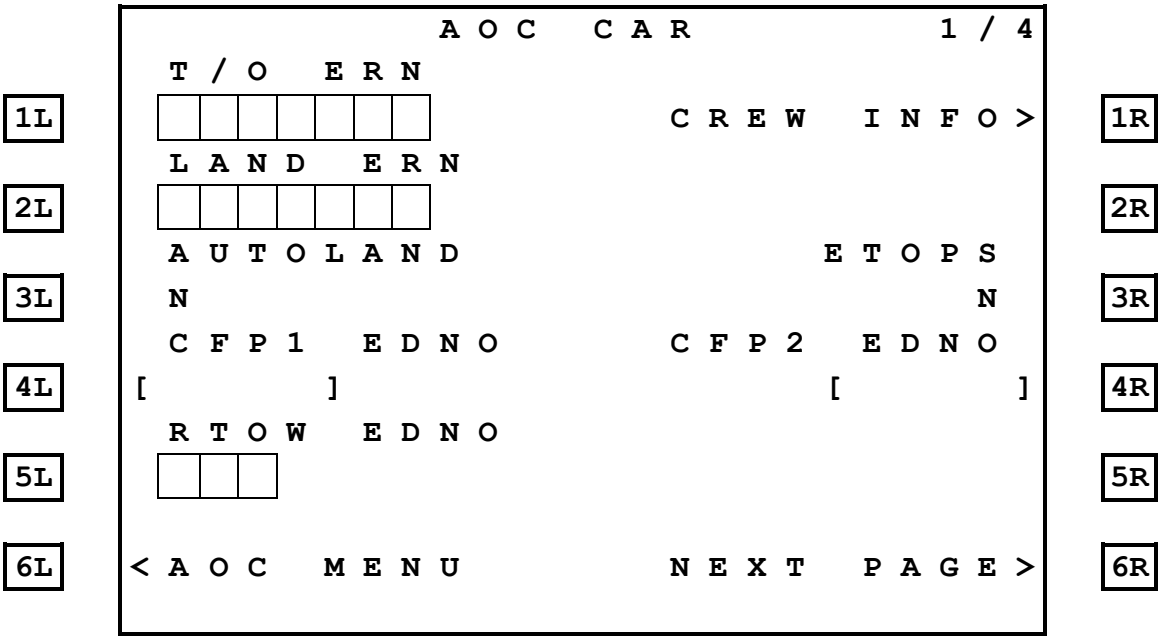
Press "INIT" (6R) to trigger the flight data and crew data uplink. When uplink is completed, an asterisk (*) will appear next to "CREW INFO" (2R). Data on the left column of the screen is retrieved automatically from the FM.

4.2 AOC CREW INFO PAGE



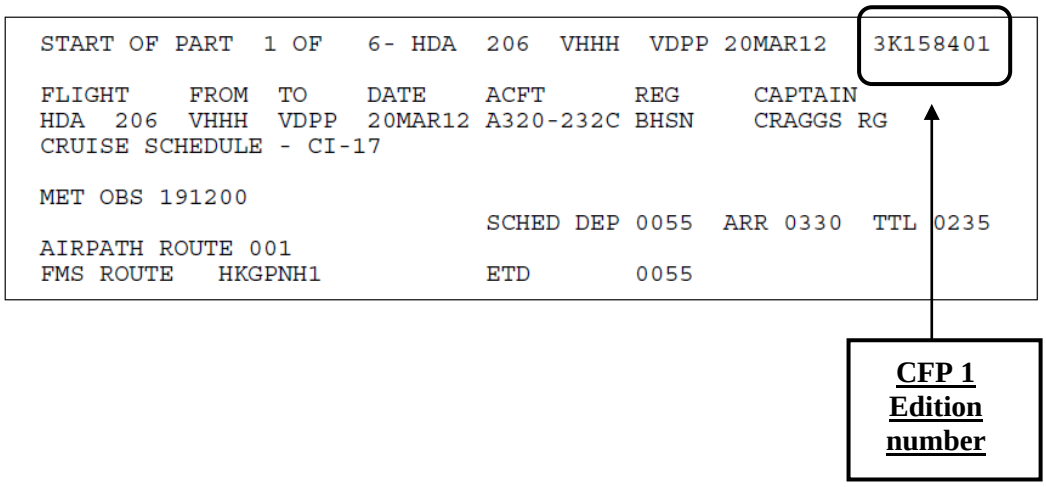
1. Data on this page is retrieved from the Crew Control System, or entered by crew.
2. Should extended ground duties occur after the “IN” event, then please include details on the CAR Comment Page.

4.3 AOC CAR 1/4 PAGE

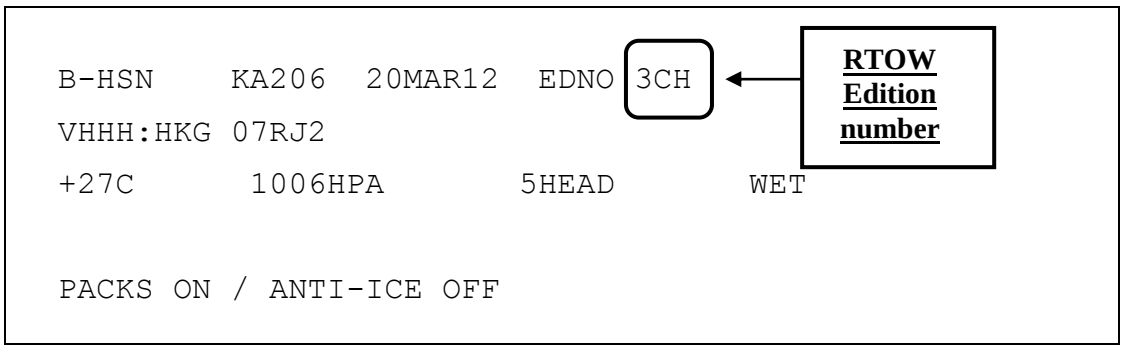


1. Key in the crew ERN for T/O and LDG.
2. Change to “Y” for “AUTOLAND” and “ETOPS” if necessary.
3. "CFP1 EDNO" (4L) should be uplinked automatically. If it differs from the EDNO of the printed CFP, crew shall verify which is the most up-to-date edition, and edit the field accordingly.
4. If CFP is requested due to inflight diversion etc. and **used**, enter that CFP edition number into "CFP2 EDNO" (4R).
5. Enter "RTOW EDNO" (5L) with the edition number from the ACARS RTOW (see sample below) or SMS RTOW or WEB RTOW output. Enter "---" if paper RTOW chart is used.

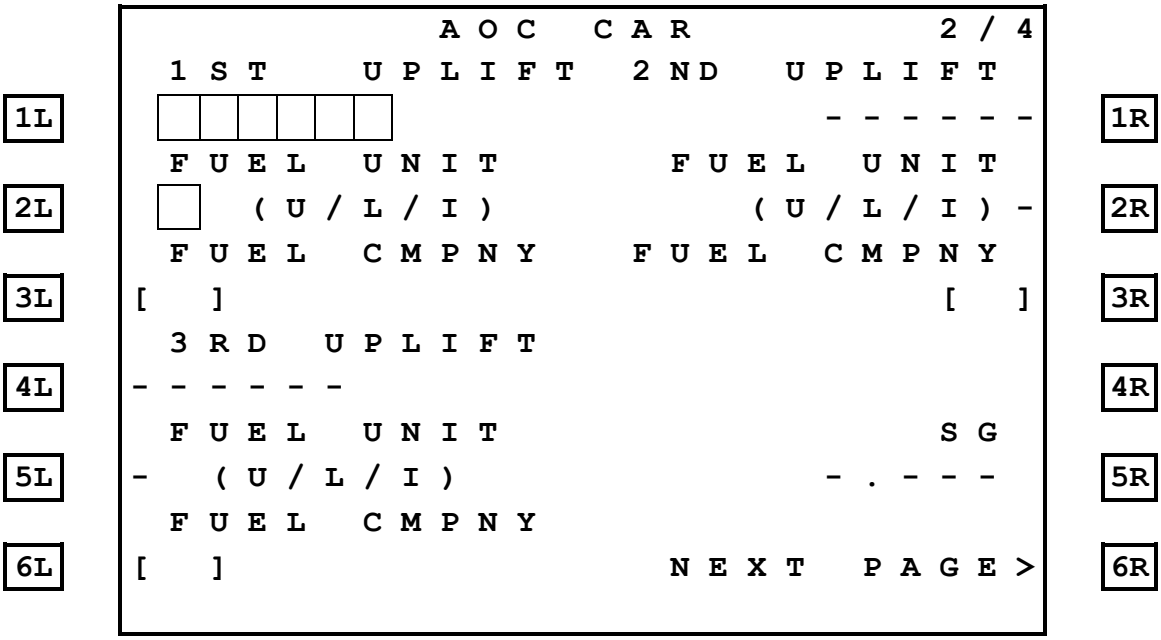
CFP1 EDNO Sample:



ACARS RTOW EDNO Sample:



4.4 AOC CAR 2/4 PAGE



1. Enter fuel units:

   "U" - US Gallons

   "L" - Litres

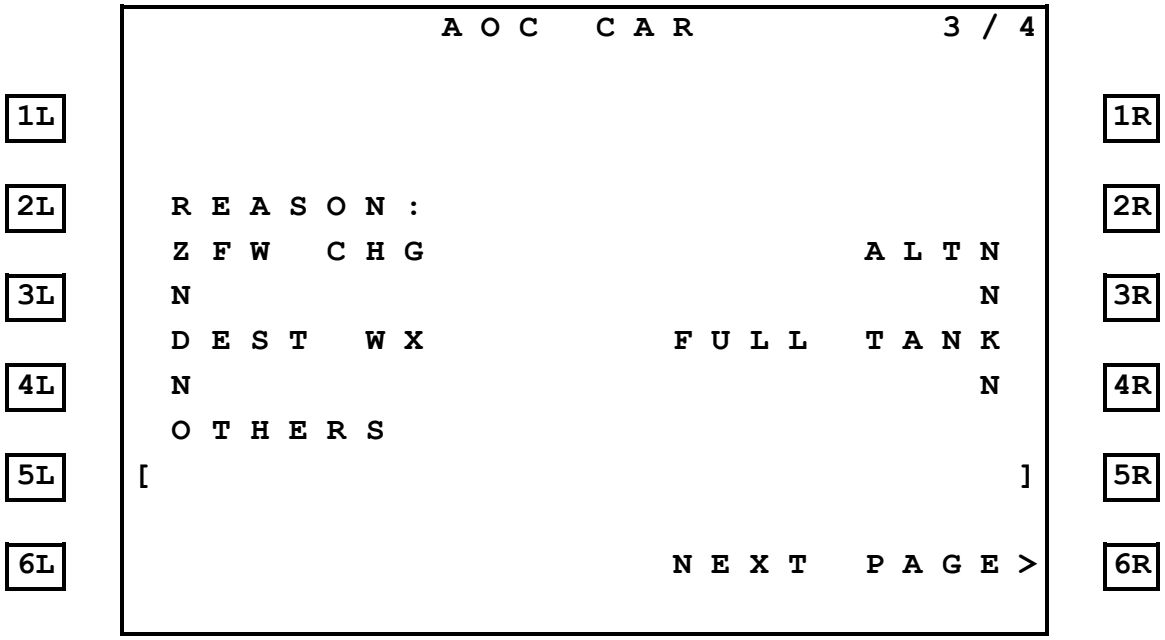
   "I" - Imperial gallons.

2. If there is no fuel uplift enter "0" – Zero, in Field 1L and "L" in 2L.

3. Fuel Supplier Codes are on the reverse of the clipboard.

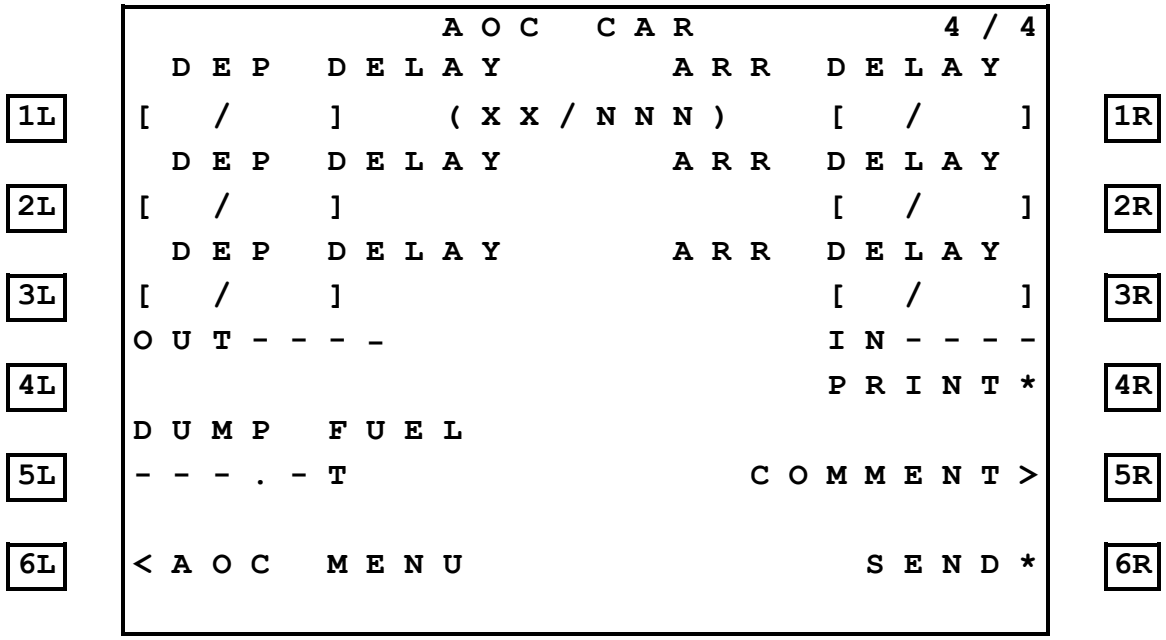
   If only one code is listed for a port, use that code regardless of what is printed on the fuel receipt.

4.5 AOC CAR 3/4 PAGE



1. Type “Y” to identify the reasons for carriage of additional fuel.
2. Type “Y” at LSK4R if fuel is tankage limited.

4.6 AOC CAR 4/4 PAGE



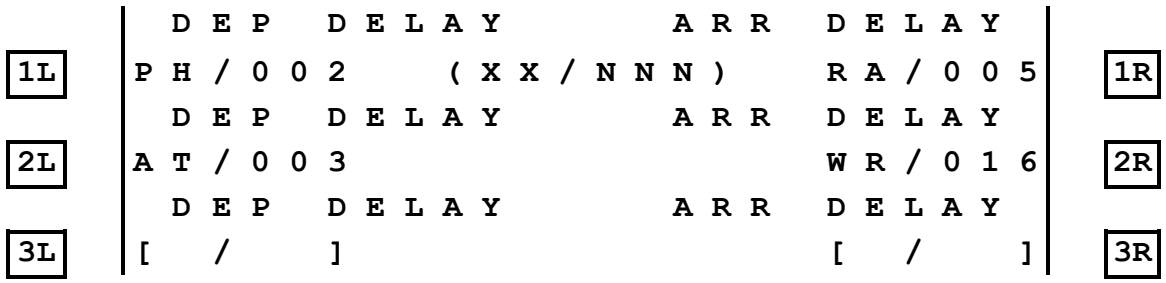
Enter quantity of fuel dumped, if appropriate, at LSK 5L.

If a comment is required, press LSK 5R to access the AOC CAR COMMENT page.

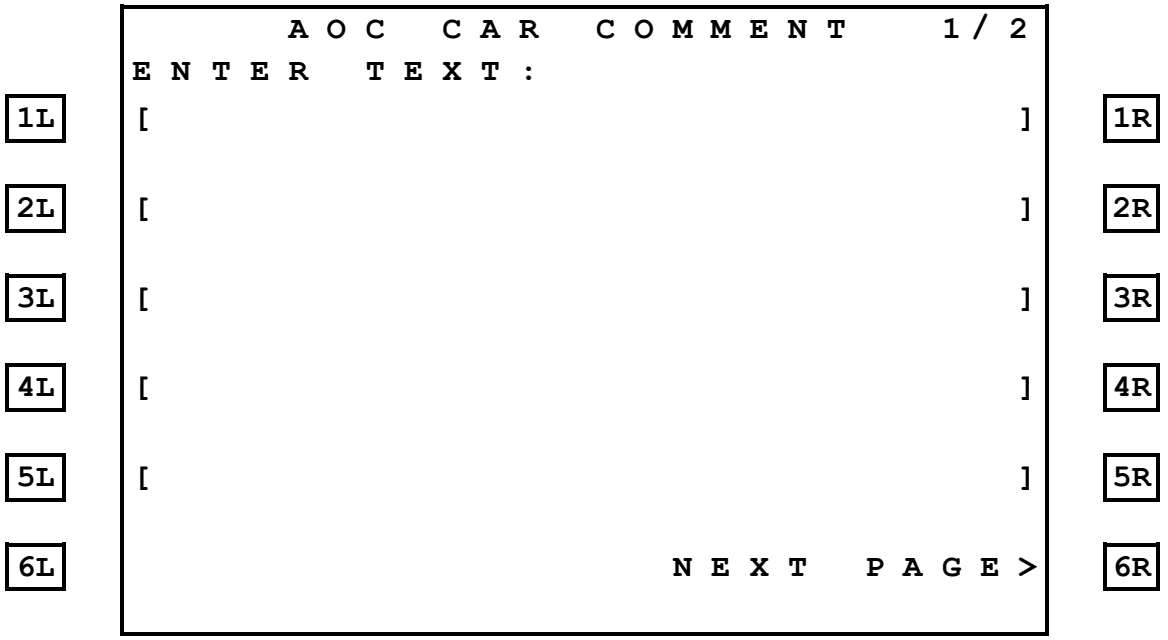
Print and sign a paper copy of the CAR for all flights and put it in the flight document envelope.

Delay Codes are listed on the reverse of the clipboard and should be entered as a two-figure code followed by a three-figure time in minutes. The left hand column allows up to three delay summaries to be entered based on the STD shown on the CFP, whilst the right hand column is based on the STA shown on the CFP.

e.g. A two minute passenger boarding delay followed by a three minute departure ATC delay, followed by a sixteen minute delay holding at destination due to weather (i.e., a total of 21 minutes late on arrival), would be shown as follows:



4.7 AOC CAR COMMENT 1/2 PAGE



Fill in this page for short CAR comment then select LSK 6R to access the MESSAGE DIRECTOR page. Type "Y" in the appropriate addressee prompt of page 2 then press LSK 6R to send. Use the paper Commander's Report Form for long messages.

It is important to print the CAR before sending any comments. If the SEND prompt is pressed before printing, comments will not be shown on the printed copy.

4.8 POST FLIGHT ACTIONS

a. No AOC CAR COMMENT included:

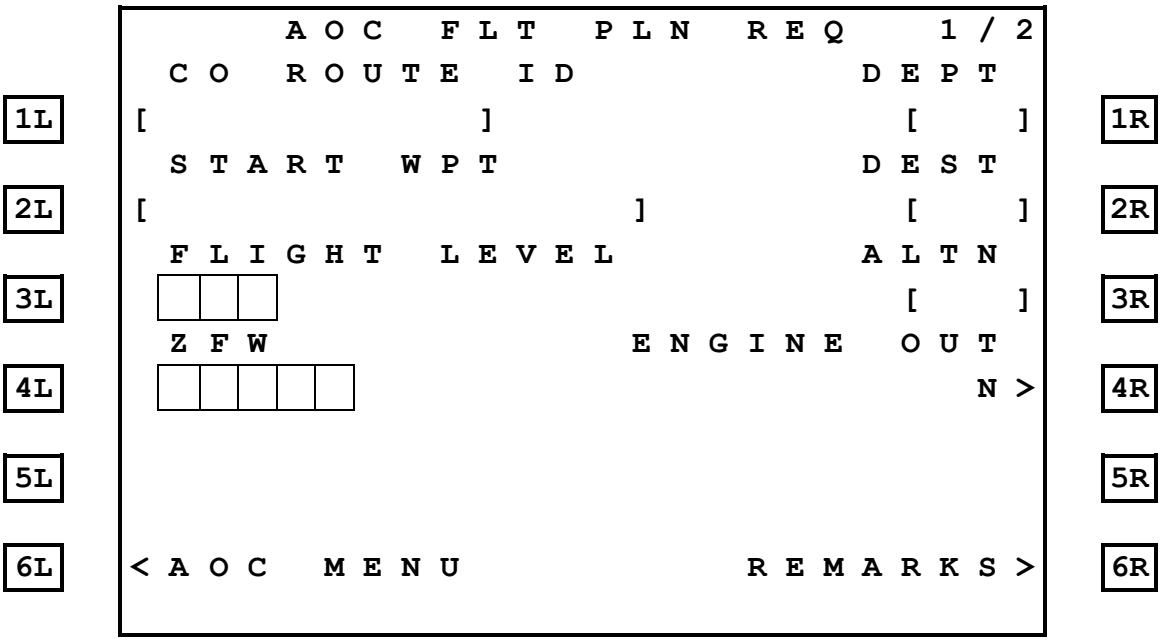
NO CREW ACTION REQUIRED – all data is automatically downlinked 10 minutes after the "IN" event.

b. AOC CAR COMMENT included:

CREW ACTION REQUIRED – If a comment is included, the "AOC CAR COMMENT" should be completed prior to the "IN" event plus 10 minutes **and the "SEND" button pressed** to pass the information to ground system.

5. AOC FLIGHT PLAN REQUEST

5.1 AOC FLIGHT PLAN REQUEST



The FLIGHT PLAN prompt on the ACARS MENU allows three types of CFP to be uplinked to the aircraft, as follows:

T1 CFP front page only

Used for ZFW change, aircraft change, alternate change, etc.

T2 Combined navigation and fuel log

As per the normal CFP, but with a simplified format. Useful for re-routings.

T3 Full CFP

As per the normal CFP format. Can be used following a diversion, etc.

Be aware that the time taken to prepare each CFP depends on the format, with T1 taking the least time, whilst T3 can take up to half an hour. The time required is also affected by the number of CFP requests received, as well as Despatch workload.

The format for the request is self-explanatory, although the following should be noted:

- All fields need to be completed.
- ZFW is in tonnes.
- For a full Departure-Destination CFP, enter the departure airport under START WPT.

Enter "T1", "T2" or "T3" as appropriate into the first line of page 2. No other text should be entered on this line, although additional information can be entered in the remaining fields.

9.4.5 COMMUNICATION

1. AIR GROUND MESSAGES

All messages sent from the aircraft are automatically addressed to a specific recipient list defined by the airline. This list includes IOC and the Engineering Department and cannot be modified by the crew. However, priority prefixes may be inserted by the crew when appropriate. Part A chapter 8 refers.

1.1 DOWNLINK MESSAGES

Aircraft to ground messages (downlink) can comprise maintenance, monitoring, operational, performance and cabin data. Messages can be grouped into two basic categories, reports and requests.

Reports can be either automatic or pilot initiated. Reports generated by a peripheral systems (CMS, ACMS, FMS) can be automatically downlinked. These will provide constant aircraft position and engine maintenance status.

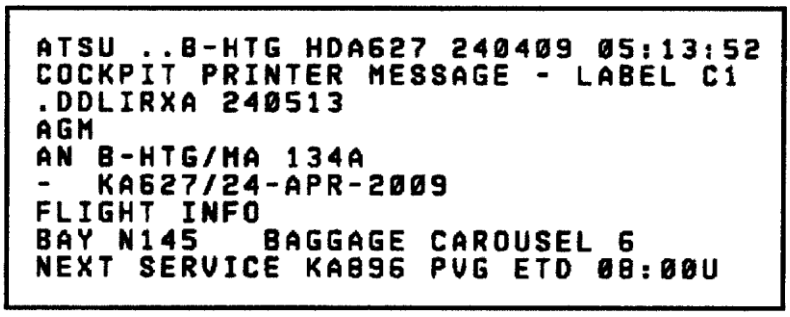
Requests are generally 'pilot initiated'. For example they are used to provide weather information to flight crew.

1.2 UPLINK MESSAGES

Ground to aircraft messages (uplink) either contains crew information or automatically embedded requests for transmission of specific downlink reports into the system.

2. STANDARD COMMUNICATION

An uplink message is sent to aircraft arriving in HKG and other selected ports. It is intended to give gate, aircraft next service and baggage carousel information. It should normally be received no later than 30 minutes before arrival. However, the message can only be delivered if the ACARS Data Service Provider “knows” where the aircraft is so that the message can be routed accordingly.



3. INFLIGHT MEDICAL EMERGENCIES THROUGH MEDLINK

Volume 7.1.19 refers.

9.4.6 SYSTEM TROUBLE SHOOTING

1. ACARS ADMINISTRATION

ACARS is a company wide communications system, monitored as follows:

Technical Administrator

- The Technical Manager Airbus (TMA) is the Flight Operations ACARS Administrator. All technical aspects of ACARS fall in this jurisdiction.

Operational Administrator

- The Manager Line Operations (MLO) is responsible for operational aspects of ACARS.

IOC

- The Manager IOC (MIOC) is responsible for ACARS AGM messages and recording ACARS flight Data.

2. FAULT REPORTING

All ACARS/ATSU defects or unserviceabilities should be reported in the Aircraft Maintenance Log. Additionally any comments or observations can be relayed via CAR and addressed to the appropriate office.

3. ACARS STANDBY

"FM Datalink Unavail" will appear on the MCDU and "ACARS STBY" appears in the ECAM when reception is lost or the system is malfunctioning.

The Dragonair ACARS system normally uses VHF. VHF provides good-quality, reliable reception but requires line-of-sight. This in turn requires use of an extensive network of ground stations. There are two possible reasons that this message can appear.

1. The aircraft simply flies out of VHF range, in which case nothing further can be done until reception is regained.
2. When transitioning from one area of coverage to another area. In this case reception should shortly be recovered and the message disappear. If the message does not disappear it can be an indication of more serious problems. If ACARS does not work after a short period of time the aircraft position, altitude, and description of problem should passed along via CAR to the Technical Manager Airbus (TMA).

Within the KA network this problem occasionally occurs around the Fuzhou area. The aircraft is flying within one area of coverage (ARINC ASIA 131.450) but in close proximity to Taiwan, which uses a different network (ARINC KOREA 131.750). The ACARS system attempts to lock-on to the Taiwan network, however the signal is poor and reception is lost. In this situation reception can be regained by manually tuning the ARINC ASIA network.

Experience has shown that some system anomalies (e.g. 'ACARS STBY' displayed) may be corrected similarly by manually tuning the Datalink Service Provider (DSP) frequency and then reselecting AUTOMATIC. However, whilst manual tuning is permitted, do not change the list of DSPs in the Scan Mask.

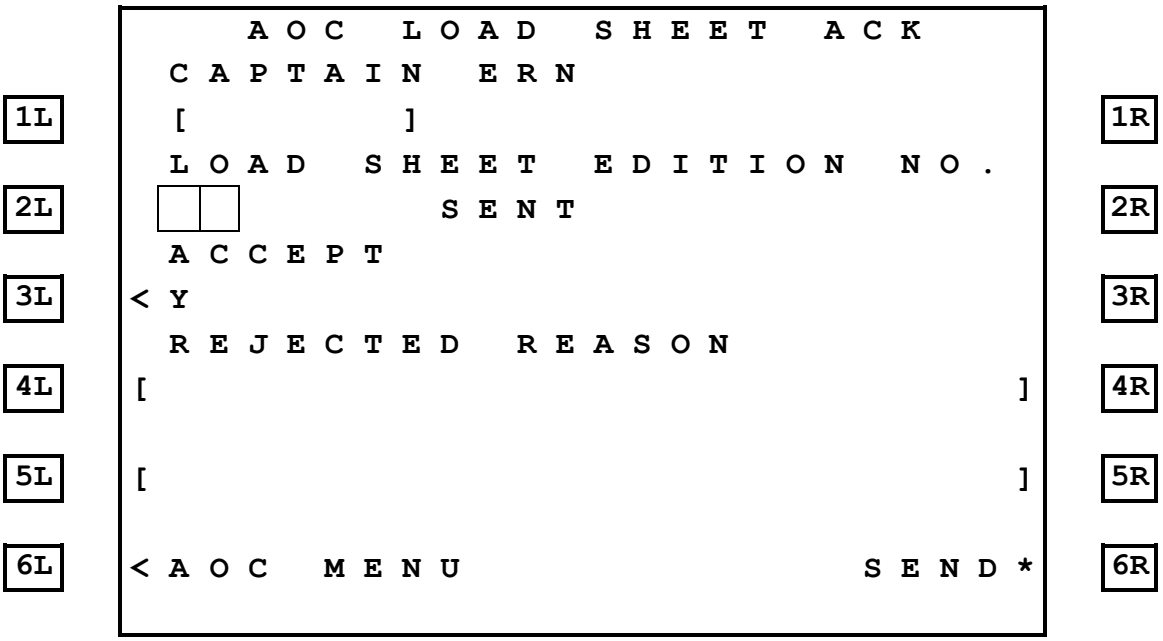
4. AIRCRAFT PRINTER MALFUNCTIONS

Pilots are permitted to replace printer paper or clear jammed paper. Instructions are found on the underside of the printer cover flap. Spare rolls of paper are stored on the cockpit bulkhead. Printer malfunctions should however be reported to Engineering through normal procedures.

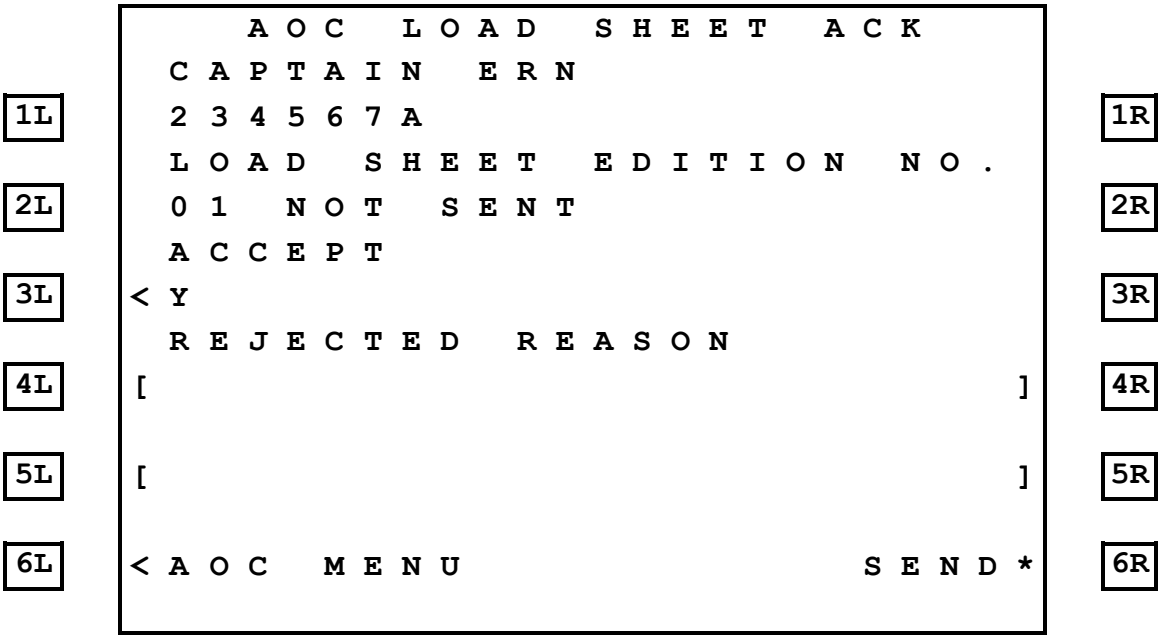
9.4.7 LOADSHEETS

1. LOADSHEET ACKNOWLEDGEMENT REPORT (LAR)

Before ACARS crew info has been uplinked:



After ACARS crew info has been uplinked:



Captain's ERN appears. This can only be changed by amending the Captain's ERN on the AOC CREW INFO page.

Loadsheet Edition Number defaults to 1. The word "NOT" appears in row 2 until LSK6R has been pressed.

INTENTIONALLY BLANK

9.4.8 ATC INTERFACE

1. PRE DEPARTURE CLEARANCE

A 2-way Pre Departure Clearance (PDC) via data link is available at certain ports, as annotated on the Port Page.

Procedure

Approximately 20 minutes before 'ready to start' send the request for Clearance by using the PDC REQUEST function on the ACARS menu. Complete the required data fields and SEND.

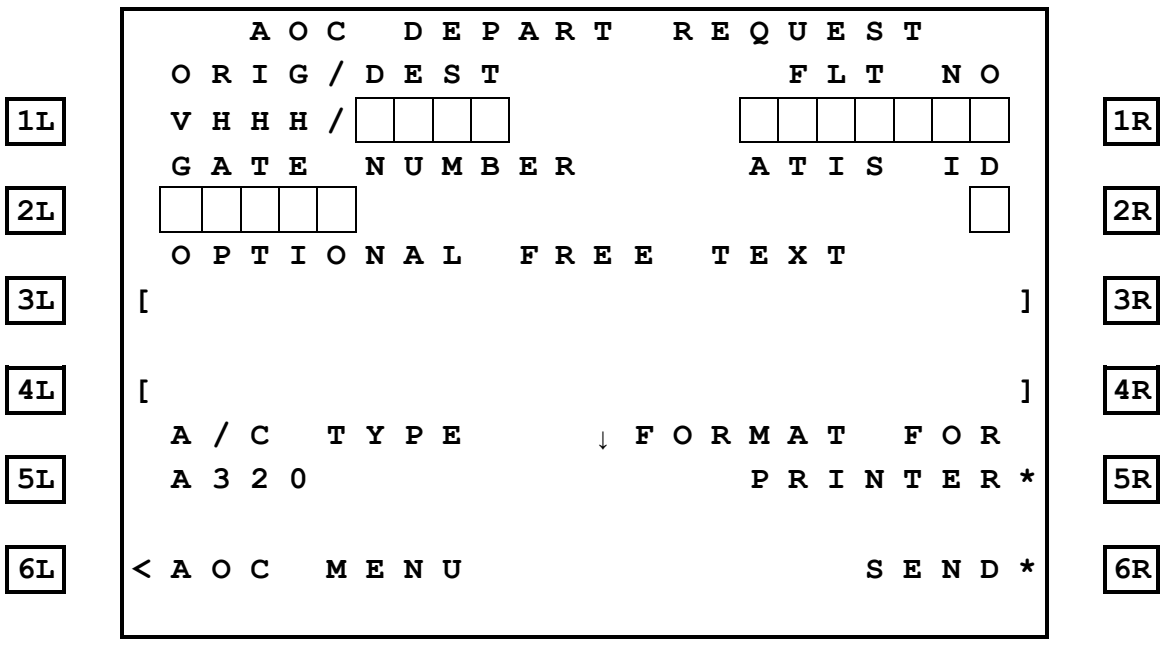
Three messages will be received during the process;

1. ATC will respond with 'Request Being Processed Standby' shortly followed by;
2. The Departure Clearance. Once crew have confirmed that the clearance is as expected, go to RECEIVED MESSAGES, open the PDC message and select ACCEPT.
3. ATC will acknowledge the acceptance of the clearance by sending a further message 'Clearance Confirmed'.

Any subsequent amendment to ATC Clearance will be issued by voice

If Clearance message is not received within 5 minutes of sending the request or if there is any technical problem with the data link exchanges, contact the appropriate Clearance Delivery Frequency.

Read-back requirements vary from airport to airport and any specific requirements will be detailed on the PDC, or the Port Page. Otherwise, report 'ready' on the frequency given in the Departure Clearance message.



2. DIGITAL ATIS

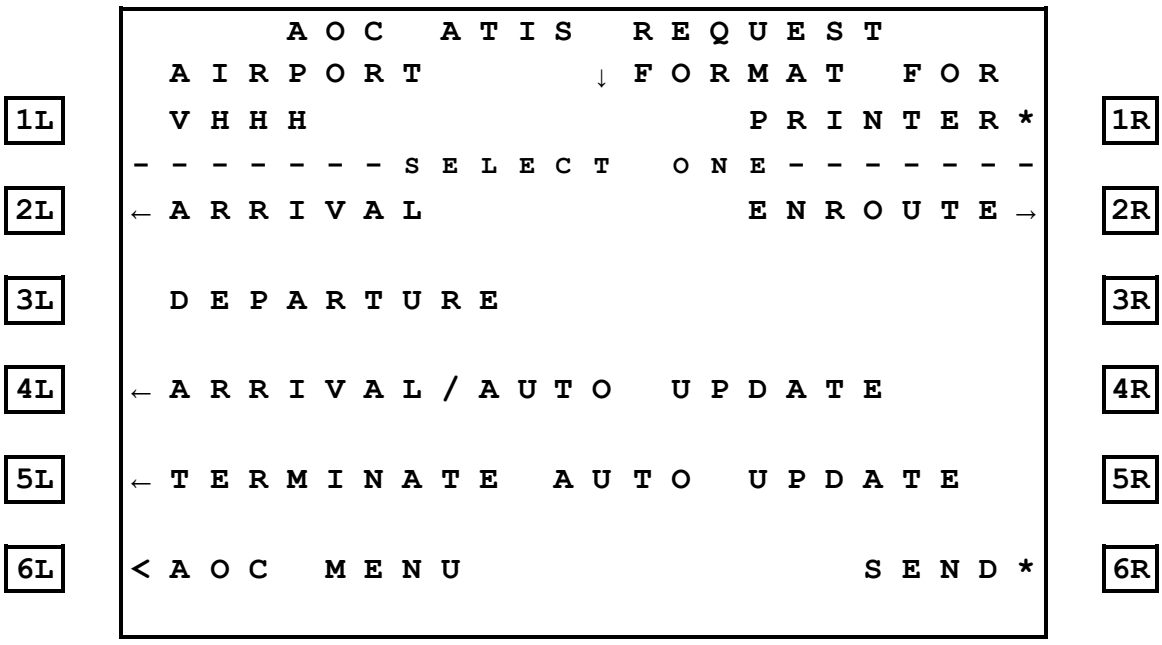
Some airports generate an electronic digital ATIS, or D-ATIS, for reception by ACARS equipped aircraft. This is in addition to the standard VHF ATIS.

D-ATIS can be received by sending an ACARS request. The ATIS REQUEST prompt can be accessed in the ACARS PRE-FLT and IN-FLT menu pages.

If a D-ATIS is received, there is no requirement to transcribe the data onto the CFP provided the printout is filed in the Flight Documents Envelope.

D-ATIS has an "Auto Update" function which, if selected by the crew, will automatically uplink to the aircraft any update of the ATIS, provided the specific airport has activated the function. Crew should ensure "Auto Update" is cancelled before leaving the aircraft.

D-ATIS has an "Enroute" function which, if selected by the crew, will uplink to the aircraft VOLMET information, provided the specific airport has activated the function.



1005 hPa / 5 KT Tail wind TOGA / CONF 2 / AC OFF / DRY

TOW	TORA ~ FT								
~1000KG	11000	10500	10000	9500	9000	8500	8000	7500	7000
235									
230									
225									
220	19C/156/57/60	3C/157/57/61							
215	31C/151/51/55	30C/150/51/55	28C/148/50/55	11C/149/51/55					
210	35C/150/51/54	34C/149/50/54	32C/146/46/51	31C/145/48/52	29C/142/45/50	13C/141/45/50			
205	39C/150/51/54	38C/149/50/53	36C/145/45/49	35C/144/46/50	33C/141/42/47	31C/138/41/46	27C/135/38/44	4C/136/38/44	
200	43C/150/51/54	42C/148/49/52	40C/144/44/48	39C/143/44/48	37C/140/41/45	35C/138/38/43	33C/134/37/42	29C/131/33/39	6C/131/33/39
195	46C/145/46/49	46C/149/49/52	44C/143/44/48	43C/142/43/47	41C/139/39/44	39C/137/37/41	37C/134/35/40	34C/130/32/37	24C/129/31/37
190	50C/146/47/50	49C/144/45/48	48C/143/43/47	47C/142/42/46	45C/138/39/43	43C/135/35/40	41C/133/33/38	39C/130/31/37	33C/128/29/36
185	53C/142/42/45	53C/146/46/49	52C/144/45/48	51C/142/42/45	49C/137/38/42	48C/136/38/42	46C/132/34/39	43C/129/30/35	38C/127/28/34
180	57C/143/43/46	56C/141/41/44	55C/139/40/43	54C/138/38/42	53C/137/37/41	51C/133/34/38	50C/132/33/38	47C/127/28/34	43C/125/26/32
175	61C/144/44/46	60C/140/40/43	59C/140/40/44	58C/138/39/42	57C/136/37/41	55C/132/33/37	53C/130/30/34	51C/127/27/32	48C/125/26/31
170	62C/131/32/36	62C/132/34/37	62C/135/36/39	62C/138/39/42	61C/136/36/39	59C/131/32/36	58C/131/31/35	56C/128/28/33	51C/125/26/32
165	62C/125/27/31	62C/125/27/31	62C/125/27/31	62C/125/27/31	62C/126/27/31	62C/127/29/33	62C/130/31/35	60C/126/27/31	55C/125/26/31
160	62C/125/26/31	62C/125/26/31	62C/125/26/31	62C/125/26/31	62C/125/26/31	62C/125/26/31	62C/125/26/31	62C/125/26/31	58C/125/26/31
155	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/125/26/31
150	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31
145	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31
140	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31
135	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32
130	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32

Max Temp/V1/VR/V2

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RCKH RCTP RJAA RJBB RJFF RJFR RJGG RJSS RJTT RKSI
RKSS ROAH RPLC RPLL RPVM VDPP VGHS VHHH VLVT VMMC
VOCI VOMM VTBD VTBS VTBU VTSP VTSS VVDN VVNB VVTS
WBSB WMKP ZBAA ZBSJ ZBTJ ZGGG ZGHA ZGKL ZGNN ZGSD
ZGSZ ZHHH ZJHK ZJSY ZLXY ZSAM ZSFZ ZSHC ZSNJ ZSPD
ZSQD ZSSS ZUCK ZYTL ZYTX

1005 hPa / 5 KT Tail wind — TOGA / CONF 2 / AC OFF / DRY

TOW ~1000KG \ TORA ~ FT	11000	10500	10000	9500	9000	8500	8000	7500	7000
235									
230									
225									
220									
215									
210									
205									
200									
195	30C/142/43/48	29C/143/44/49	15C/145/46/51						
190	34C/139/40/46	33C/140/41/46	32C/141/42/48	30C/138/40/45	29C/142/45/50	15C/142/44/50			
185	38C/137/38/43	37C/137/39/44	36C/138/39/45	35C/139/40/46	33C/136/38/44	32C/139/41/46	30C/135/37/43	28C/135/37/43	4C/136/39/46
180	42C/135/36/41	41C/135/36/42	40C/136/37/43	39C/137/39/44	38C/137/38/44	36C/134/36/42	35C/137/39/45	33C/133/35/41	31C/131/32/39
175	47C/139/40/44	45C/133/34/39	44C/134/36/41	43C/133/35/40	42C/134/35/40	41C/137/38/44	39C/132/34/40	38C/135/37/43	36C/130/33/39
170	50C/132/32/37	49C/131/32/37	48C/131/33/38	47C/131/33/38	46C/132/34/40	45C/132/33/39	43C/129/31/37	42C/130/32/38	40C/128/29/36
165	54C/131/32/36	53C/130/31/36	52C/130/30/35	51C/130/31/36	50C/130/32/37	49C/132/34/39	48C/131/32/38	46C/127/29/35	45C/128/31/37
160	58C/129/30/34	57C/128/29/34	56C/128/29/33	55C/128/29/34	54C/128/29/34	53C/129/31/36	52C/129/30/36	50C/125/27/32	49C/126/27/33
155	62C/127/28/33	61C/126/27/32	60C/126/27/32	59C/125/27/32	58C/126/27/32	57C/127/29/34	56C/129/31/36	54C/124/26/32	53C/124/26/32
150	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	61C/124/26/31	60C/125/26/31	59C/126/28/33	57C/124/26/31
145	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31
140	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31
135	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32
130	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32

Max Temp/V1/VR/V2

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RJOA VECC VGEG VIDP VILK WBKK ZSNB ZUUU

DragonAir A330

RTOW EDNO : 741

Group B chart

(2011/04/29)

1005 hPa / 5 KT Tail wind TOGA/CONF 2/AC OFF/WET

TOW ~1000KG	TORA ~ FT 11000	10500	10000	9500	9000	8500	8000	7500	7000
235									
230									
225									
220	11C/153/59/62								
215	31C/148/53/57	29C/144/51/55	23C/144/50/54	7C/144/50/55					
210	35C/147/52/56	33C/144/49/53	32C/142/47/52	30C/139/44/49	28C/136/46/50	10C/136/46/51			
205	38C/145/50/53	37C/143/49/52	36C/141/46/50	34C/138/43/47	32C/135/41/46	30C/132/39/44	26C/129/39/44	4C/130/39/44	
200	42C/145/48/51	41C/143/49/52	40C/140/45/49	38C/137/42/46	37C/135/44/48	35C/131/40/45	32C/128/35/41	29C/124/33/39	6C/124/33/39
195	46C/144/47/51	45C/142/46/50	44C/140/45/49	42C/136/41/45	41C/134/42/46	39C/130/38/43	37C/127/36/41	34C/124/32/38	20C/123/31/37
190	49C/141/45/48	49C/142/47/50	47C/137/40/44	46C/135/40/44	45C/133/41/45	43C/129/37/41	41C/127/34/39	38C/123/30/36	24C/123/29/36
185	53C/142/44/47	52C/140/44/48	51C/137/41/44	50C/135/39/43	48C/130/36/41	47C/128/36/40	45C/125/33/38	41C/123/28/34	28C/124/27/34
180	56C/138/41/44	56C/139/43/46	55C/137/41/44	53C/132/37/41	52C/131/35/39	51C/128/36/40	49C/124/33/37	43C/123/26/32	31C/123/26/33
175	60C/137/39/42	59C/137/41/44	58C/134/38/42	57C/132/37/40	56C/129/36/40	55C/127/36/40	53C/124/32/36	46C/123/26/32	33C/124/26/33
170	62C/129/34/37	62C/131/36/39	62C/134/40/43	61C/131/37/40	60C/129/34/37	58C/125/31/35	57C/123/30/34	48C/123/26/32	36C/123/26/33
165	62C/125/27/31	62C/125/27/31	62C/125/27/31	62C/125/27/31	62C/125/28/32	62C/124/30/34	60C/123/26/31	50C/123/26/32	38C/123/26/33
160	62C/125/26/31	62C/125/26/31	62C/125/26/31	62C/125/26/31	62C/125/26/31	62C/125/26/31	62C/123/26/31	52C/123/26/32	40C/124/26/33
155	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/123/27/32	55C/123/26/31	42C/124/26/33
150	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/27/32	57C/123/26/31	45C/123/26/33
145	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	59C/123/26/31	47C/124/26/33
140	62C/125/26/31	62C/125/26/31	62C/125/26/31	62C/125/26/31	62C/125/26/31	62C/125/26/31	62C/125/26/31	62C/123/26/31	50C/124/26/33
135	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/124/27/32	52C/124/26/33
130	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/124/26/32	55C/124/26/33

Max Temp/V1/VR/V2

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RCKH RCTP RJAA RJBB RJFF RJFR RJGG RJSS RJTT RKSI
RKSS ROAH RPLC RPLL RPVM VDPP VGHS VHHH VLVT VMMC
VOCI VOMM VTBD VTBS VTBU VTSP VTSS VVDN VVNB VVTS
WBSB WMKP ZBAA ZBSJ ZBTJ ZGGG ZGHA ZGKL ZGNN ZGSD
ZGSZ ZHHH ZJHK ZJSY ZLXY ZSAM ZSFZ ZSHC ZSNJ ZSPD
ZSQD ZSSS ZUCK ZYTL ZYTX

DragonAir A330 RTOW EDNO : 740 **Group A chart**

(2011/04/29)

1005 hPa / 5 KT Tail wind TOGA/CONF 2/AC OFF/WET

TOW	TORA ~ FT								
~1000KG	11000	10500	10000	9500	9000	8500	8000	7500	7000
235									
230									
225									
220									
215									
210									
205									
200									
195	30C/141/45/50	29C/143/47/52	11C/144/48/53						
190	34C/141/46/50	33C/139/43/48	31C/135/40/45	30C/136/40/46	29C/137/42/48	10C/138/44/49			
185	38C/137/42/46	37C/138/42/47	36C/137/40/46	34C/134/38/44	33C/134/38/44	32C/135/41/47	30C/131/37/43	23C/129/37/43	
180	42C/135/39/44	41C/135/39/44	40C/135/39/44	39C/135/39/44	37C/131/35/41	36C/132/37/43	34C/129/34/40	32C/126/32/39	30C/124/31/38
175	46C/133/37/42	45C/132/37/42	44C/132/37/42	43C/133/37/42	42C/134/37/42	40C/129/33/39	39C/129/34/40	37C/125/33/39	33C/124/26/34
170	50C/132/36/41	49C/131/35/40	48C/130/35/40	47C/131/35/40	46C/130/33/39	44C/127/30/36	43C/127/32/38	42C/125/32/38	36C/123/26/33
165	54C/131/35/40	53C/130/34/39	52C/129/33/38	51C/129/33/38	50C/130/34/39	49C/129/32/38	47C/126/29/35	46C/124/30/36	38C/123/26/33
160	58C/128/31/35	57C/129/33/38	56C/128/32/37	55C/128/32/36	54C/128/32/37	53C/128/32/37	51C/125/27/32	50C/124/29/34	40C/124/26/33
155	62C/126/30/34	61C/125/28/33	60C/127/31/35	59C/126/30/35	58C/126/30/35	57C/125/28/33	56C/125/30/35	54C/123/26/32	42C/124/26/33
150	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/125/27/32	61C/125/27/32	60C/124/26/31	57C/123/26/31	45C/123/26/33
145	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	62C/124/26/31	59C/123/26/31	47C/124/26/33
140	62C/125/26/31	62C/125/26/31	62C/125/26/31	62C/125/26/31	62C/125/26/31	62C/125/26/31	62C/125/26/31	62C/123/26/31	50C/124/26/33
135	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/124/27/32	52C/124/26/33
130	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/125/26/32	62C/124/26/32	55C/124/26/33

Max Temp/V1/VR/V2

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RJOA VECC VGEG VIDP VILK WBKK ZSNB ZUUU

990 hPa / 5 KT Tail wind

TOGA / CONF 2 / AC OFF / DRY

TOW	TORA ~ FT								
~1000KG	11000	10500	10000	9500	9000	8500	8000	7500	7000
235									
230									
225									
220									
215	29C/152/53/56	27C/150/52/56	11C/151/52/56						
210	33C/151/52/56	32C/150/50/54	30C/146/47/51	28C/144/45/49	16C/144/47/52				
205	37C/150/51/55	36C/149/49/53	34C/145/46/50	32C/142/43/47	31C/141/45/49	28C/137/40/45	13C/137/40/45		
200	41C/151/52/55	40C/149/49/52	38C/144/45/49	37C/143/44/48	35C/140/43/47	33C/137/40/44	30C/134/35/41	22C/132/34/39	
195	44C/145/46/50	43C/144/45/49	42C/143/44/48	41C/142/42/46	39C/139/40/44	37C/136/37/42	35C/133/36/41	31C/130/32/37	16C/129/31/37
190	48C/146/47/50	47C/144/45/48	46C/143/44/47	45C/142/42/45	43C/138/39/43	41C/135/36/40	39C/132/34/39	36C/129/30/36	30C/127/29/36
185	52C/148/48/51	51C/145/46/49	50C/144/44/47	49C/141/41/45	47C/137/38/42	45C/134/35/39	43C/131/32/37	41C/129/30/35	35C/126/28/34
180	55C/142/42/45	54C/140/40/44	53C/139/39/42	52C/138/38/42	51C/137/37/41	49C/133/34/38	48C/131/33/38	45C/128/28/33	41C/125/26/32
175	59C/141/42/44	58C/141/42/45	57C/139/39/42	56C/137/38/41	55C/136/37/40	53C/132/33/37	51C/129/29/34	49C/126/27/32	45C/125/25/31
170	61C/133/34/38	61C/135/36/39	61C/138/38/41	60C/138/38/42	59C/136/36/40	57C/131/32/36	56C/130/32/36	53C/126/26/31	49C/125/26/31
165	61C/124/26/31	61C/124/26/31	61C/124/26/31	61C/126/27/31	61C/128/29/33	61C/130/31/35	60C/129/31/34	58C/126/26/31	53C/124/26/31
160	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/125/26/30	56C/124/26/31
155	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/124/26/30	60C/124/25/30
150	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/124/25/30
145	61C/124/25/30	61C/124/25/30	61C/124/25/30	61C/124/25/30	61C/124/25/30	61C/124/25/30	61C/124/25/30	61C/124/25/30	61C/124/25/30
140	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31
135	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31
130	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31

Max Temp/V1/VR/V2

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RCKH RCTP RJAA RJBB RJFF RJFR RJGG RJSS RJTT RKSI
RKSS ROAH RPLC RPLL RPVM VDPP VGHS VHHH VLVT VMMC
VOCI VOMM VTBD VTBS VTBU VTSP VTSS VVDN VVNB VVTS
WBSB WMKP ZBAA ZBSJ ZBTJ ZGGG ZGHA ZGKL ZGNN ZGSD
ZGSZ ZHHH ZJHK ZJSY ZLXY ZSAM ZSFZ ZSHC ZSNJ ZSPD
ZSQD ZSSS ZUCK ZYTL ZYTX

DragonAir A330

RTOW EDNO : 743

Group A chart

(2011/04/29)

990 hPa / 5 KT Tail wind

TOGA / CONF 2 / AC OFF / DRY

TOW	TORA ~ FT								
~1000KG	11000	10500	10000	9500	9000	8500	8000	7500	7000
235									
230									
225									
220									
215									
210									
205									
200									
195	28C/144/45/50	11C/146/48/53							
190	32C/141/42/47	31C/141/42/48	29C/139/41/46	28C/139/40/46	13C/142/44/49				
185	36C/138/39/44	35C/138/40/45	34C/139/41/46	32C/136/38/44	31C/139/41/47	30C/141/42/48	28C/138/41/46	8C/139/42/48	
180	40C/135/36/42	39C/135/37/42	38C/136/38/43	37C/137/38/43	35C/134/36/42	34C/137/39/44	32C/133/35/41	31C/134/36/42	28C/130/31/38
175	45C/140/41/45	43C/133/34/40	42C/133/35/40	41C/135/37/42	40C/134/35/41	38C/132/34/40	37C/134/36/42	35C/130/32/38	33C/129/30/37
170	48C/131/32/37	47C/131/32/37	46C/131/33/38	45C/131/33/38	44C/134/36/41	43C/133/34/39	41C/130/32/38	40C/132/34/40	38C/128/30/36
165	52C/130/31/36	51C/129/30/35	50C/129/30/36	49C/129/31/36	48C/130/32/37	47C/132/35/40	46C/132/34/39	44C/128/30/36	43C/129/32/38
160	56C/128/29/34	55C/128/29/33	54C/127/28/33	53C/128/29/34	52C/128/29/34	51C/129/30/36	50C/128/30/35	48C/125/26/32	47C/126/28/33
155	60C/126/27/32	59C/126/27/31	58C/125/27/31	57C/125/26/31	56C/125/26/31	55C/126/28/33	54C/127/29/34	53C/129/31/36	51C/124/25/31
150	61C/124/25/30	61C/124/25/30	61C/124/25/30	61C/124/25/30	60C/124/25/30	59C/124/25/30	58C/124/25/31	57C/125/26/32	56C/126/28/33
145	61C/124/25/30	61C/124/25/30	61C/124/25/30	61C/124/25/30	61C/124/25/30	61C/124/25/30	61C/124/25/30	61C/124/25/30	60C/124/25/31
140	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31
135	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31
130	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31

Max Temp/V1/VR/V2

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RJOA VECC VGEG VIDP VILK WBKK ZSNB ZUUU

990 hPa / 5 KT Tail wind — TOGA / CONF 2 / AC OFF / WET

TOW	TORA ~ FT								
~1000KG	11000	10500	10000	9500	9000	8500	8000	7500	7000
235									
230									
225									
220									
215	28C/147/53/57	24C/146/52/56	7C/147/53/57						
210	32C/146/49/53	31C/144/48/52	29C/140/47/51	28C/139/47/51	12C/139/48/53				
205	36C/145/48/52	35C/143/47/51	34C/141/47/51	32C/138/44/48	30C/135/41/46	28C/132/40/45	12C/131/41/46		
200	40C/144/48/51	39C/142/47/50	38C/140/46/49	36C/137/43/47	34C/134/39/44	32C/130/38/43	30C/128/36/42	22C/125/34/40	
195	44C/145/51/54	43C/142/47/50	41C/138/41/45	40C/136/41/45	38C/133/38/42	37C/130/40/44	34C/127/34/39	31C/123/32/37	16C/123/31/37
190	47C/140/42/46	47C/141/46/50	45C/137/40/44	44C/135/40/44	42C/132/36/41	41C/129/38/42	39C/126/35/40	36C/123/31/36	21C/123/29/36
185	51C/140/43/46	50C/139/42/45	49C/136/40/44	48C/134/40/44	46C/131/35/40	45C/128/36/40	43C/125/33/38	39C/123/28/34	26C/123/27/34
180	55C/141/45/48	54C/139/42/46	53C/136/41/44	52C/134/40/43	50C/130/35/39	49C/127/35/39	47C/124/32/36	41C/123/26/32	29C/123/25/33
175	58C/139/43/46	57C/136/39/43	57C/136/41/44	55C/131/36/40	54C/129/34/38	52C/125/31/36	51C/123/31/35	44C/122/25/31	31C/123/25/33
170	61C/132/37/40	61C/134/37/40	60C/133/38/41	59C/131/36/40	58C/129/33/37	56C/124/30/35	55C/123/30/35	46C/123/25/31	33C/123/25/33
165	61C/124/26/31	61C/124/26/31	61C/125/27/31	61C/125/29/33	61C/126/30/34	60C/124/29/33	58C/122/26/30	48C/123/25/31	36C/123/25/33
160	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/122/26/30	50C/123/25/31	38C/123/25/33
155	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/124/26/30	61C/123/26/31	53C/123/25/31	40C/123/25/33
150	61C/124/25/30	61C/124/25/30	61C/124/25/30	61C/124/25/30	61C/124/25/30	61C/124/25/30	61C/123/26/31	55C/123/25/31	42C/123/25/33
145	61C/124/26/31	61C/124/26/31	61C/124/26/31	61C/124/26/31	61C/124/26/31	61C/124/26/31	61C/124/25/30	57C/123/25/31	45C/123/25/33
140	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	60C/123/25/31	48C/123/25/32
135	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/123/26/32	50C/123/25/32
130	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/26/32	53C/123/25/32

Max Temp/V1/VR/V2

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RCKH RCTP RJAA RJBB RJFF RJFR RJGG RJSS RJTT RKSI
RKSS ROAH RPLC RPLL RPVM VDPP VGHS VHHH VLVT VMMC
VOCI VOMM VTBD VTBS VTBU VTSP VTSS VVDN VVNB VVTS
WBSB WMKP ZBAA ZBSJ ZBTJ ZGGG ZGHA ZGKL ZGNN ZGSD
ZGSZ ZHHH ZJHK ZJSY ZLXY ZSAM ZSFZ ZSHC ZSNJ ZSPD
ZSQD ZSSS ZUCK ZYTL ZYTX

DragonAir A330 RTOW EDNO : 744 **Group A chart**

(2011/04/29)

990 hPa / 5 KT Tail wind

TOGA / CONF 2 / AC OFF / WET

TOW	TORA ~ FT								
~1000KG	11000	10500	10000	9500	9000	8500	8000	7500	7000
235									
230									
225									
220									
215									
210									
205									
200									
195	27C/143/47/52	5C/144/48/53							
190	32C/140/43/48	30C/136/41/46	29C/138/42/47	28C/138/42/47	9C/141/45/50				
185	36C/137/40/45	35C/137/41/46	33C/134/38/44	32C/135/39/45	31C/135/39/45	29C/132/38/44	27C/132/40/46	3C/133/41/47	
180	40C/136/41/46	39C/137/42/47	38C/135/38/44	36C/132/36/42	35C/133/37/42	34C/132/37/43	32C/129/36/42	30C/126/33/39	27C/124/34/40
175	44C/134/38/43	43C/133/38/43	42C/134/38/43	41C/133/36/41	39C/130/35/41	38C/130/35/41	37C/129/36/41	35C/126/32/39	31C/123/27/34
170	48C/132/36/41	47C/131/36/40	46C/131/35/40	45C/132/36/41	44C/130/34/39	42C/127/31/37	41C/126/31/37	39C/124/28/35	33C/123/25/33
165	52C/131/35/39	51C/130/34/38	50C/129/33/38	49C/129/33/38	48C/131/35/40	47C/128/32/37	45C/126/30/36	44C/123/29/35	36C/123/25/33
160	56C/129/34/38	55C/128/32/37	54C/127/31/36	53C/127/31/36	52C/127/31/36	51C/127/30/35	49C/125/27/32	48C/123/29/35	38C/123/25/33
155	60C/125/28/32	59C/127/31/35	58C/126/30/34	57C/126/29/34	56C/126/29/34	55C/125/27/32	54C/125/30/35	52C/123/26/31	40C/123/25/33
150	61C/124/25/30	61C/124/25/30	61C/124/25/30	61C/124/26/31	60C/124/26/31	59C/124/26/31	58C/124/25/31	55C/123/25/31	42C/123/25/33
145	61C/124/26/31	61C/124/26/31	61C/124/26/31	61C/124/25/30	61C/124/25/30	61C/124/25/30	61C/124/25/30	57C/123/25/31	45C/123/25/33
140	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	60C/123/25/31	48C/123/25/32
135	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/123/26/32	50C/123/25/32
130	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/25/31	61C/124/26/32	53C/123/25/32

Max Temp/V1/VR/V2

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RJOA VECC VGEG VIDP VILK WBKK ZSNB ZUUU

DragonAir A330

RTOW EDNO : 746

Group B chart

(2011/04/29)

1005 hPa

TOGA/CONF 2/AC OFF/DRY

TOW	Wind Component ~ KT			
~1000KG	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
205	43C 149/56/59	44C 153/60/62	44C 154/60/62	44C 153/60/62
200	47C 150/56/59	47C 150/56/59	47C 149/56/59	47C 148/56/59
195	50C 147/53/56	51C 154/60/62	51C 154/60/62	51C 154/60/62
190	54C 150/56/58	54C 151/56/58	54C 150/56/58	54C 150/56/58
185	56C 142/49/51	56C 140/49/51	56C 139/49/51	56C 138/49/51
180	56C 129/39/42	56C 129/39/42	56C 129/39/42	56C 129/39/42
175	56C 125/31/36	56C 125/31/36	56C 125/31/36	56C 125/31/36
170	56C 122/25/30	56C 122/25/30	56C 122/25/30	56C 122/25/30
165	56C 121/22/28	56C 121/22/28	56C 121/22/28	56C 121/22/28
160	56C 121/22/28	56C 121/22/28	56C 121/22/28	56C 121/22/28
155	56C 121/22/28	56C 121/22/28	56C 121/22/28	56C 121/22/28
150	56C 121/22/28	56C 121/22/28	56C 121/22/28	56C 121/22/28
145	56C 121/22/28	56C 121/22/28	56C 121/22/28	56C 121/22/28
140	56C 121/22/28	56C 121/22/28	56C 121/22/28	56C 121/22/28
135	56C 121/22/29	56C 121/22/29	56C 121/22/29	56C 121/22/29
130	56C 121/22/29	56C 121/22/29	56C 121/22/29	56C 121/22/29

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

1005 hPa

TOGA/CONF 2/AC OFF/DRY

TOW	Wind Component ~ KT			
~1000KG	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
205	42C 151/54/56	43C 155/57/59	43C 154/57/59	44C 159/61/62
200	45C 149/51/54	47C 155/57/59	47C 155/57/59	47C 155/57/59
195	49C 149/51/53	50C 152/54/56	50C 152/54/56	50C 151/54/56
190	53C 150/52/53	53C 149/52/53	54C 155/57/58	54C 155/57/58
185	56C 148/50/51	56C 147/50/51	56C 146/50/51	56C 146/50/51
180	56C 134/40/42	56C 132/40/42	56C 131/40/42	56C 130/40/42
175	56C 126/33/36	56C 126/33/36	56C 126/33/36	56C 126/33/36
170	56C 123/26/30	56C 123/26/30	56C 123/26/30	56C 123/26/30
165	56C 121/23/27	56C 121/23/27	56C 121/23/27	56C 121/23/27
160	56C 121/23/27	56C 121/23/27	56C 121/23/27	56C 121/23/27
155	56C 121/22/27	56C 121/22/27	56C 121/22/27	56C 121/22/27
150	56C 121/22/27	56C 121/22/27	56C 121/22/27	56C 121/22/27
145	56C 121/22/27	56C 121/22/27	56C 121/22/27	56C 121/22/27
140	56C 121/22/27	56C 121/22/27	56C 121/22/27	56C 121/22/27
135	56C 121/22/28	56C 121/22/28	56C 121/22/28	56C 121/22/28
130	56C 121/22/28	56C 121/22/28	56C 121/22/28	56C 121/22/28

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

1005 hPa

TOGA / CONF 2 / AC OFF / WET

TOW	Wind Component ~ KT			
~1000KG	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
205	43C 144/56/59	44C 149/60/62	44C 149/60/62	44C 149/60/62
200	47C 145/56/59	47C 145/56/59	47C 145/56/59	47C 146/56/59
195	50C 142/53/56	51C 149/60/62	51C 150/60/62	51C 150/60/62
190	53C 140/51/53	54C 146/56/58	54C 146/56/58	54C 146/56/58
185	56C 138/49/51	56C 137/49/51	56C 137/49/51	56C 137/49/51
180	56C 129/39/42	56C 129/39/42	56C 129/39/42	56C 129/39/42
175	56C 125/31/36	56C 125/31/36	56C 125/31/36	56C 125/31/36
170	56C 122/25/30	56C 122/25/30	56C 122/25/30	56C 122/25/30
165	56C 121/22/28	56C 121/22/28	56C 121/22/28	56C 121/22/28
160	56C 121/22/28	56C 121/22/28	56C 121/22/28	56C 121/22/28
155	56C 121/22/28	56C 121/22/28	56C 121/22/28	56C 121/22/28
150	56C 121/22/28	56C 121/22/28	56C 121/22/28	56C 121/22/28
145	56C 121/22/28	56C 121/22/28	56C 121/22/28	56C 121/22/28
140	56C 121/22/28	56C 121/22/28	56C 121/22/28	56C 121/22/28
135	56C 121/22/29	56C 121/22/29	56C 121/22/29	56C 121/22/29
130	56C 121/22/29	56C 121/22/29	56C 121/22/29	56C 121/22/29

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

1005 hPa

TOGA / CONF 2 / AC OFF / WET

TOW	Wind Component ~ KT			
~1000KG	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
205	42C 146/54/56	43C 149/57/59	43C 150/57/59	44C 153/61/62
200	45C 143/51/54	47C 150/57/59	47C 150/57/59	47C 150/57/59
195	49C 143/51/53	50C 147/54/56	50C 148/54/56	50C 148/54/56
190	53C 144/52/53	53C 145/52/53	54C 150/57/58	54C 151/57/58
185	56C 142/49/51	56C 143/50/51	56C 143/50/51	56C 142/50/51
180	56C 130/40/42	56C 129/40/42	56C 129/40/42	56C 129/40/42
175	56C 126/33/36	56C 126/33/36	56C 126/33/36	56C 126/33/36
170	56C 123/26/30	56C 123/26/30	56C 123/26/30	56C 123/26/30
165	56C 121/23/27	56C 121/23/27	56C 121/23/27	56C 121/23/27
160	56C 121/23/27	56C 121/23/27	56C 121/23/27	56C 121/23/27
155	56C 121/22/27	56C 121/22/27	56C 121/22/27	56C 121/22/27
150	56C 121/22/27	56C 121/22/27	56C 121/22/27	56C 121/22/27
145	56C 121/22/27	56C 121/22/27	56C 121/22/27	56C 121/22/27
140	56C 121/22/27	56C 121/22/27	56C 121/22/27	56C 121/22/27
135	56C 121/22/28	56C 121/22/28	56C 121/22/28	56C 121/22/28
130	56C 121/22/28	56C 121/22/28	56C 121/22/28	56C 121/22/28

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

990 hPa

TOGA/CONF 2/AC OFF/DRY

TOW	Wind Component ~ KT			
~1000KG	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
205	41C 149/56/59	42C 154/60/63	42C 154/60/63	42C 154/60/63
200	45C 149/56/59	45C 150/56/59	46C 157/63/65	46C 157/63/65
195	48C 147/53/56	49C 153/59/61	49C 153/59/61	49C 153/59/61
190	52C 149/55/57	52C 149/55/57	52C 149/55/57	52C 148/55/57
185	55C 147/52/54	55C 146/52/54	55C 145/52/54	55C 144/52/54
180	55C 129/40/43	55C 129/40/43	55C 129/40/43	55C 129/40/43
175	55C 126/33/37	55C 126/33/37	55C 126/33/37	55C 126/33/37
170	55C 122/26/31	55C 122/26/31	55C 122/26/31	55C 122/26/31
165	55C 120/22/27	55C 120/22/27	55C 120/22/27	55C 120/22/27
160	55C 120/22/27	55C 120/22/27	55C 120/22/27	55C 120/22/27
155	55C 120/22/27	55C 120/22/27	55C 120/22/27	55C 120/22/27
150	55C 120/22/27	55C 120/22/27	55C 120/22/27	55C 120/22/27
145	55C 120/22/28	55C 120/22/28	55C 120/22/28	55C 120/22/28
140	55C 120/22/28	55C 120/22/28	55C 120/22/28	55C 120/22/28
135	55C 121/22/28	55C 121/22/28	55C 121/22/28	55C 121/22/28
130	55C 121/22/28	55C 121/22/28	55C 121/22/28	55C 121/22/28

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

990 hPa

TOGA / CONF 2 / AC OFF / DRY

TOW	Wind Component ~ KT			
~1000KG	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
205	39C 150/52/55	41C 155/57/59	41C 155/57/59	42C 159/61/63
200	43C 149/51/54	45C 155/57/59	45C 155/57/59	45C 155/57/59
195	47C 149/51/53	48C 152/54/56	48C 152/54/56	49C 157/59/61
190	51C 149/51/53	51C 149/51/53	52C 154/56/57	52C 154/56/57
185	54C 147/49/50	55C 152/53/54	55C 151/53/54	55C 151/53/54
180	55C 137/41/43	55C 135/41/43	55C 134/41/43	55C 133/41/43
175	55C 126/34/37	55C 126/34/37	55C 126/34/37	55C 126/34/37
170	55C 123/27/31	55C 123/27/31	55C 123/27/31	55C 123/27/31
165	55C 121/22/26	55C 121/22/26	55C 121/22/26	55C 121/22/26
160	55C 120/22/26	55C 120/22/26	55C 120/22/26	55C 120/22/26
155	55C 120/22/26	55C 120/22/26	55C 120/22/26	55C 120/22/26
150	55C 120/22/26	55C 120/22/26	55C 120/22/26	55C 120/22/26
145	55C 120/22/26	55C 120/22/26	55C 120/22/26	55C 120/22/26
140	55C 120/22/27	55C 120/22/27	55C 120/22/27	55C 120/22/27
135	55C 120/22/27	55C 120/22/27	55C 120/22/27	55C 120/22/27
130	55C 121/22/27	55C 121/22/27	55C 121/22/27	55C 121/22/27

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

990 hPa

TOGA / CONF 2 / AC OFF / WET

TOW	Wind Component ~ KT			
~1000KG	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
205	41C 144/56/59	42C 149/60/63	42C 149/60/63	42C 150/60/63
200	45C 144/56/59	45C 145/56/59	46C 152/63/65	46C 153/63/65
195	48C 142/53/56	49C 148/59/61	49C 148/59/61	49C 149/59/61
190	52C 144/55/57	52C 145/55/57	52C 145/55/57	52C 145/55/57
185	55C 141/52/54	55C 142/52/54	55C 142/52/54	55C 142/52/54
180	55C 129/40/43	55C 129/40/43	55C 129/40/43	55C 129/40/43
175	55C 126/33/37	55C 126/33/37	55C 126/33/37	55C 126/33/37
170	55C 122/26/31	55C 122/26/31	55C 122/26/31	55C 122/26/31
165	55C 120/22/27	55C 120/22/27	55C 120/22/27	55C 120/22/27
160	55C 120/22/27	55C 120/22/27	55C 120/22/27	55C 120/22/27
155	55C 120/22/27	55C 120/22/27	55C 120/22/27	55C 120/22/27
150	55C 120/22/27	55C 120/22/27	55C 120/22/27	55C 120/22/27
145	55C 120/22/28	55C 120/22/28	55C 120/22/28	55C 120/22/28
140	55C 120/22/28	55C 120/22/28	55C 120/22/28	55C 120/22/28
135	55C 120/22/28	55C 120/22/28	55C 120/22/28	55C 120/22/28
130	55C 120/22/28	55C 120/22/28	55C 120/22/28	55C 120/22/28

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

990 hPa

TOGA / CONF 2 / AC OFF / WET

TOW	Wind Component ~ KT			
~1000KG	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
205	39C 144/52/55	41C 149/57/59	41C 150/57/59	42C 154/61/63
200	43C 143/51/54	45C 149/57/59	45C 150/57/59	45C 150/57/59
195	47C 143/51/53	48C 147/54/56	48C 147/54/56	49C 152/59/61
190	51C 143/51/53	51C 144/51/53	52C 149/56/57	52C 150/56/57
185	54C 141/49/50	55C 146/53/54	55C 147/53/54	55C 147/53/54
180	55C 133/41/43	55C 131/41/43	55C 130/41/43	55C 130/41/43
175	55C 126/34/37	55C 126/34/37	55C 126/34/37	55C 126/34/37
170	55C 123/27/31	55C 123/27/31	55C 123/27/31	55C 123/27/31
165	55C 121/22/26	55C 121/22/26	55C 121/22/26	55C 121/22/26
160	55C 120/22/26	55C 120/22/26	55C 120/22/26	55C 120/22/26
155	55C 120/22/26	55C 120/22/26	55C 120/22/26	55C 120/22/26
150	55C 120/22/26	55C 120/22/26	55C 120/22/26	55C 120/22/26
145	55C 120/22/26	55C 120/22/26	55C 120/22/26	55C 120/22/26
140	55C 120/22/27	55C 120/22/27	55C 120/22/27	55C 120/22/27
135	55C 120/22/27	55C 120/22/27	55C 120/22/27	55C 120/22/27
130	55C 120/22/27	55C 120/22/27	55C 120/22/27	55C 120/22/27

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

1005 hPa

TOGA/CONF 2/PACKS OFF/DRY

TOW ~1000KG	Wind Component ~ KT 10 KT TAIL	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
205					
200					
195					
190					
185			3C 142/43/48	19C 141/42/47	21C 141/42/47
180		17C 139/40/45	23C 136/38/43	24C 135/37/42	25C 135/36/41
175	20C 132/35/40	24C 133/35/40	28C 136/37/42	29C 135/36/41	30C 135/36/40
170	25C 130/31/37	29C 132/33/38	33C 137/38/43	34C 135/36/41	35C 134/35/40
165	30C 128/30/35	34C 131/32/37	37C 130/31/36	39C 134/35/40	40C 134/35/39
160	35C 126/28/33	39C 130/32/36	42C 129/31/35	43C 129/30/35	44C 129/30/35
155	40C 124/26/31	44C 130/31/36	47C 130/31/35	48C 130/32/36	49C 131/32/36
150	45C 123/25/30	48C 124/26/30	51C 126/27/31	52C 126/27/31	53C 127/28/32
145	50C 124/25/30	52C 120/22/27	53C 119/20/25	53C 119/20/25	53C 119/20/25
140	53C 119/20/25	53C 119/20/25	53C 119/20/25	53C 119/20/25	53C 119/20/25
135	53C 119/20/25	53C 119/20/25	53C 119/20/25	53C 119/20/25	53C 119/20/25
130	53C 119/20/26	53C 119/20/26	53C 119/20/26	53C 119/20/26	53C 119/20/26

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

1005 hPa

TOGA/CONF 2/PACKS OFF/DRY

TOW ~1000KG	Wind Component ~ KT				
	10 KT TAIL	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
205			14C 147/51/56	20C 145/49/54	21C 145/48/53
200		20C 141/45/50	23C 143/45/50	24C 142/44/49	25C 143/44/49
195	20C 135/40/45	24C 139/42/47	28C 143/46/51	29C 144/46/51	30C 145/47/51
190	25C 135/38/44	29C 139/43/48	32C 141/43/48	33C 141/43/48	34C 141/43/48
185	30C 135/39/44	33C 137/39/44	36C 138/39/44	37C 138/40/44	38C 138/40/44
180	34C 133/35/41	38C 137/40/45	41C 140/42/46	41C 135/37/42	42C 136/37/42
175	39C 132/36/41	42C 135/37/42	45C 137/39/43	46C 139/41/45	46C 134/35/40
170	43C 130/32/38	46C 132/34/39	49C 136/38/42	49C 131/33/37	50C 132/34/38
165	48C 132/35/39	50C 130/32/37	52C 129/31/35	53C 130/32/36	53C 128/29/34
160	52C 131/34/38	53C 125/26/31	53C 121/22/27	53C 120/20/26	53C 119/20/26
155	53C 119/20/26	53C 119/20/26	53C 119/20/26	53C 119/20/26	53C 119/20/26
150	53C 119/20/26	53C 119/20/26	53C 119/20/26	53C 119/20/26	53C 119/20/26
145	53C 119/20/26	53C 119/20/26	53C 119/20/26	53C 119/20/26	53C 119/20/26
140	53C 119/20/26	53C 119/20/26	53C 119/20/26	53C 119/20/26	53C 119/20/26
135	53C 119/20/27	53C 119/20/27	53C 119/20/27	53C 119/20/27	53C 119/20/27
130	53C 119/20/27	53C 119/20/27	53C 119/20/27	53C 119/20/27	53C 119/20/27

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

1005 hPa

TOGA/CONF 2/PACKS OFF/WET

TOW ~1000KG	Wind Component ~ KT				
	10 KT TAIL	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
205					
200					
195					
190					
185				15C 140/44/48	20C 135/38/43
180		13C 137/41/46	23C 135/39/44	24C 135/38/43	25C 134/38/42
175	20C 130/36/42	24C 132/35/41	27C 132/36/41	29C 135/39/43	30C 134/38/42
170	25C 129/35/40	29C 131/35/40	32C 131/36/40	33C 130/34/39	34C 129/33/38
165	30C 127/32/38	34C 131/34/39	37C 129/32/37	38C 130/35/39	39C 129/34/38
160	35C 126/30/36	39C 129/32/37	42C 128/31/36	43C 128/31/35	44C 128/31/35
155	40C 125/30/35	43C 125/29/34	46C 125/30/34	47C 125/29/34	48C 125/30/34
150	45C 122/26/31	48C 122/26/31	51C 125/29/33	52C 126/30/33	52C 122/26/30
145	49C 121/23/28	52C 121/25/29	53C 119/20/25	53C 119/20/25	53C 119/20/25
140	53C 119/20/25	53C 119/20/25	53C 119/20/25	53C 119/20/25	53C 119/20/25
135	53C 119/20/25	53C 119/20/25	53C 119/20/25	53C 119/20/25	53C 119/20/25
130	53C 119/20/26	53C 119/20/26	53C 119/20/26	53C 119/20/26	53C 119/20/26

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

1005 hPa

TOGA/CONF 2/PACKS OFF/WET

TOW ~1000KG	Wind Component ~ KT				
	10 KT TAIL	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
205			10C 142/50/55	20C 141/49/53	21C 141/48/53
200		16C 135/44/50	23C 138/45/50	24C 139/49/53	25C 140/45/50
195	19C 129/39/45	24C 134/42/48	27C 136/44/49	28C 137/43/48	29C 138/43/48
190	24C 128/36/42	28C 132/39/45	32C 137/46/50	33C 138/45/50	34C 139/46/50
185	29C 127/36/42	33C 132/40/45	36C 134/41/45	37C 135/41/45	38C 136/41/45
180	33C 125/33/39	37C 130/36/42	40C 133/40/45	41C 134/38/42	42C 135/38/43
175	38C 125/34/40	42C 130/37/42	44C 131/37/42	45C 132/37/42	46C 134/39/43
170	43C 124/33/38	46C 128/35/39	48C 129/35/39	49C 131/35/40	50C 133/37/41
165	47C 123/33/38	50C 127/33/37	52C 128/33/38	53C 130/34/39	53C 126/31/35
160	51C 121/30/35	53C 123/28/33	53C 120/23/28	53C 119/21/27	53C 119/20/26
155	53C 119/21/27	53C 119/20/26	53C 119/20/26	53C 119/20/26	53C 119/20/26
150	53C 119/20/26	53C 119/20/26	53C 119/20/26	53C 119/20/26	53C 119/20/26
145	53C 119/20/26	53C 119/20/26	53C 119/20/26	53C 119/20/26	53C 119/20/26
140	53C 119/20/26	53C 119/20/26	53C 119/20/26	53C 119/20/26	53C 119/20/26
135	53C 119/20/27	53C 119/20/27	53C 119/20/27	53C 119/20/27	53C 119/20/27
130	53C 119/20/27	53C 119/20/27	53C 119/20/27	53C 119/20/27	53C 119/20/27

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

990 hPa

TOGA/CONF 2/PACKS OFF/DRY

TOW ~1000KG	Wind Component ~ KT 10 KT TAIL	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
205					
200					
195					
190					
185					10C 143/45/49
180			20C 135/37/42	22C 140/42/46	23C 138/39/44
175	4C 137/39/44	22C 137/38/43	25C 134/35/40	26C 133/35/39	28C 139/40/44
170	23C 132/34/39	26C 130/32/37	30C 133/34/39	31C 132/34/38	32C 132/33/38
165	28C 131/33/38	31C 129/30/35	35C 132/33/37	36C 131/32/37	37C 131/32/36
160	33C 128/30/35	36C 127/28/33	40C 130/31/35	41C 131/32/36	42C 131/32/36
155	38C 126/27/32	41C 125/27/32	44C 126/27/32	45C 126/27/31	46C 126/27/32
150	43C 124/26/31	46C 125/27/31	49C 126/28/32	50C 126/27/31	51C 127/28/32
145	48C 125/27/31	50C 121/22/27	53C 123/24/28	53C 120/20/25	53C 118/19/24
140	52C 119/20/25	53C 118/19/24	53C 118/19/24	53C 118/19/24	53C 118/19/24
135	53C 118/19/25	53C 118/19/25	53C 118/19/25	53C 118/19/25	53C 118/19/25
130	53C 118/19/25	53C 118/19/25	53C 118/19/25	53C 118/19/25	53C 118/19/25

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

990 hPa

TOGA/CONF 2/PACKS OFF/DRY

TOW ~1000KG	Wind Component ~ KT				
	10 KT TAIL	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
205				4C 149/53/57	17C 148/53/57
200		2C 144/49/54	21C 144/48/52	22C 145/47/52	23C 146/48/52
195	10C 138/43/49	22C 140/44/49	25C 142/44/49	26C 142/44/49	27C 142/44/49
190	22C 134/37/43	26C 138/41/46	29C 139/41/46	30C 139/41/46	31C 139/41/46
185	27C 134/37/43	31C 138/42/47	34C 140/42/47	35C 140/42/46	36C 140/42/46
180	32C 133/37/42	35C 135/38/43	38C 136/38/43	39C 136/38/43	40C 137/38/43
175	37C 134/39/44	40C 136/38/43	42C 133/35/40	43C 134/35/40	44C 134/36/40
170	41C 131/34/39	44C 133/36/40	47C 137/39/43	47C 132/33/38	48C 132/34/38
165	45C 128/30/35	48C 130/33/37	50C 129/31/35	51C 130/32/36	52C 131/33/37
160	50C 131/34/38	52C 129/30/35	53C 125/26/31	53C 123/24/29	53C 122/23/28
155	53C 123/25/30	53C 119/20/25	53C 118/19/25	53C 118/19/25	53C 118/19/25
150	53C 118/19/25	53C 118/19/25	53C 118/19/25	53C 118/19/25	53C 118/19/25
145	53C 118/19/25	53C 118/19/25	53C 118/19/25	53C 118/19/25	53C 118/19/25
140	53C 118/19/26	53C 118/19/26	53C 118/19/26	53C 118/19/26	53C 118/19/26
135	53C 118/19/26	53C 118/19/26	53C 118/19/26	53C 118/19/26	53C 118/19/26
130	53C 118/19/26	53C 118/19/26	53C 118/19/26	53C 118/19/26	53C 118/19/26

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

990 hPa

TOGA/CONF 2/PACKS OFF/WET

TOW ~1000KG	Wind Component ~ KT				
	10 KT TAIL	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
205					
200					
195					
190					
185					5C 140/44/49
180			20C 134/38/43	21C 134/37/42	22C 134/39/44
175	1C 134/39/44	21C 133/39/44	25C 133/37/41	26C 132/36/41	27C 133/37/42
170	23C 130/36/42	26C 131/36/41	30C 132/36/40	31C 132/35/40	32C 133/37/41
165	28C 129/35/40	31C 129/34/38	35C 132/36/40	36C 131/34/38	37C 130/33/37
160	33C 127/33/38	36C 128/32/37	39C 126/31/36	41C 130/34/38	42C 130/33/37
155	38C 125/29/34	41C 124/27/32	44C 124/27/32	45C 124/28/32	46C 127/31/35
150	43C 124/27/32	46C 124/27/32	49C 126/29/33	49C 121/26/30	50C 122/26/30
145	47C 121/24/29	50C 121/25/30	53C 121/24/29	53C 120/22/27	53C 118/20/24
140	52C 119/22/26	53C 118/19/24	53C 118/19/24	53C 118/19/24	53C 118/19/24
135	53C 118/19/25	53C 118/19/25	53C 118/19/25	53C 118/19/25	53C 118/19/25
130	53C 118/19/25	53C 118/19/25	53C 118/19/25	53C 118/19/25	53C 118/19/25

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

990 hPa

TOGA/CONF 2/PACKS OFF/WET

TOW ~1000KG	Wind Component ~ KT				
	10 KT TAIL	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
205				0C 145/53/58	13C 143/52/56
200			20C 137/44/50	21C 138/47/52	23C 141/50/54
195	2C 132/42/47	21C 133/41/47	25C 137/45/50	26C 138/45/50	27C 139/45/50
190	21C 127/35/41	26C 132/41/47	29C 136/44/49	30C 136/42/47	31C 137/42/47
185	26C 126/35/40	30C 131/38/43	33C 133/39/44	34C 134/40/45	36C 138/45/49
180	31C 126/34/40	35C 130/38/43	38C 133/39/43	39C 134/39/44	40C 135/40/44
175	36C 125/34/39	39C 128/37/42	42C 132/39/44	43C 133/40/44	44C 133/37/41
170	40C 123/32/38	44C 128/36/40	46C 130/36/40	47C 131/36/41	48C 133/39/43
165	45C 123/31/36	48C 126/33/38	50C 128/33/38	51C 130/35/39	52C 131/34/38
160	49C 121/30/35	52C 125/31/36	53C 123/28/32	53C 121/26/30	53C 120/24/29
155	53C 120/28/33	53C 119/21/26	53C 118/19/25	53C 118/19/25	53C 118/19/25
150	53C 118/19/25	53C 118/19/25	53C 118/19/25	53C 118/19/25	53C 118/19/25
145	53C 118/19/25	53C 118/19/25	53C 118/19/25	53C 118/19/25	53C 118/19/25
140	53C 118/19/26	53C 118/19/26	53C 118/19/26	53C 118/19/26	53C 118/19/26
135	53C 118/19/26	53C 118/19/26	53C 118/19/26	53C 118/19/26	53C 118/19/26
130	53C 118/19/26	53C 118/19/26	53C 118/19/26	53C 118/19/26	53C 118/19/26

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

1005 hPa / 5 KT Tail wind TOGA/CONF 2/AC OFF/DRY

TOW	TORA ~ FT								
~1000KG	11000	10500	10000	9500	9000	8500	8000	7500	7000
76	29C/152/52/57	23C/153/53/58	15C/154/54/59						
74	43C/149/49/53	42C/147/47/52	42C/149/49/53	40C/146/46/50	25C/146/47/51	8C/146/48/53			
72	47C/149/49/53	47C/151/51/56	45C/146/46/50	44C/145/45/49	43C/144/44/48	41C/141/41/45	31C/139/41/45	10C/139/41/45	
70	51C/150/50/54	50C/148/48/52	49C/146/46/50	48C/145/45/49	46C/141/41/45	45C/140/40/44	43C/137/38/42	41C/134/36/40	19C/134/36/40
68	54C/146/46/49	54C/149/49/53	53C/146/46/50	52C/145/45/48	50C/141/41/44	49C/140/40/43	47C/137/37/40	45C/134/35/38	40C/131/34/38
66	57C/143/43/46	57C/144/44/48	56C/143/43/46	56C/145/45/48	54C/140/40/43	53C/139/39/42	51C/136/36/39	49C/133/33/36	46C/130/32/36
64	61C/143/43/46	60C/141/41/44	60C/143/43/46	59C/141/41/44	58C/139/39/42	57C/138/38/41	55C/134/34/37	54C/133/34/37	51C/129/30/34
62	64C/140/40/42	64C/142/42/44	63C/139/39/42	63C/142/42/45	62C/139/39/42	61C/138/38/40	59C/133/33/36	58C/132/32/35	56C/129/29/32
60	67C/137/37/39	67C/138/38/41	66C/136/36/38	66C/138/38/40	65C/135/35/38	65C/138/38/40	63C/132/32/35	62C/131/31/34	60C/128/28/31
58	69C/131/31/33	69C/132/32/34	69C/133/33/35	69C/135/35/37	69C/137/37/39	68C/134/34/37	67C/132/32/34	66C/130/30/33	64C/127/27/29
56	69C/120/23/25	69C/122/23/25	69C/123/23/25	69C/124/24/26	69C/124/24/27	69C/125/25/27	69C/126/26/28	69C/127/27/29	68C/126/26/28
54	69C/116/21/23	69C/116/21/23	69C/116/21/23	69C/116/21/23	69C/116/21/23	69C/116/21/23	69C/116/21/23	69C/116/21/23	69C/118/21/23
52	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22
50	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22
48	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22
46	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22
44	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Max Temp/V1/VR/V2

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RCMQ RCTP RJBB RJCC RJFF RJFR RJGG RJSS RJTT RKSI
ROAH RPLC RPLL RPVM VGHS VHHH VMMC VTBD VTBS VTBU
VTSP VTSS VVDN VVNB VVTS WBKL WBSB WMKP ZBAA ZBSJ
ZGHA ZGKL ZGNN ZGSD ZGSZ ZHHH ZJHK ZJSY ZSAM ZSFZ
ZSHC ZSNJ ZSPD ZSQD ZSSS ZYTX

1005 hPa / 5 KT Tail wind TOGA / CONF 2 / AC OFF / DRY

TOW	TORA ~ FT								
~1000KG	11000	10500	10000	9500	9000	8500	8000	7500	7000
76									
74									
72									
70									
68									
66	42C/143/43/48	41C/143/43/47	40C/144/44/48	21C/147/47/51					
64	46C/143/43/47	45C/142/42/46	44C/141/41/45	43C/140/40/45	42C/140/40/45	41C/141/41/45	35C/142/42/46	9C/143/43/48	
62	50C/143/43/47	49C/141/41/44	48C/140/40/43	47C/139/39/43	46C/139/39/43	45C/139/39/43	44C/139/39/43	42C/135/35/39	41C/136/36/40
60	54C/140/40/43	53C/138/38/42	52C/137/37/41	51C/137/37/40	50C/137/37/40	49C/137/37/40	48C/137/37/41	47C/137/37/41	45C/133/33/38
58	57C/133/33/36	57C/136/36/39	56C/135/35/38	55C/134/34/37	54C/133/33/37	53C/133/33/37	52C/133/33/37	51C/134/34/38	50C/135/35/39
56	61C/131/31/34	61C/135/35/38	60C/133/33/36	59C/132/32/35	58C/131/31/34	57C/130/30/34	56C/130/30/34	55C/130/30/34	54C/130/30/34
54	65C/129/29/32	64C/128/28/31	64C/131/31/34	63C/129/29/33	62C/129/29/32	61C/128/28/31	60C/127/27/31	59C/127/27/31	58C/127/27/31
52	69C/129/29/31	68C/127/27/29	67C/125/25/28	67C/128/28/31	66C/126/26/29	65C/126/26/29	64C/125/25/28	63C/124/24/28	62C/124/24/27
50	69C/115/19/22	69C/115/19/22	69C/117/19/22	69C/119/19/22	69C/121/21/24	69C/124/24/27	68C/123/23/26	67C/122/22/25	66C/121/21/25
48	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/117/19/22
46	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22
44	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22

Max Temp/V1/VR/V2

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RCKH RJAA RJOA RKPK RKSS VDPP VECC VIDP VILK VLVT WBKK ZBTJ ZGGG ZLXY ZSNB ZUCK ZUUU ZYTL

1005 hPa / 5 KT Tail wind TOGA/CONF 2/AC OFF/WET

TOW	TORA ~ FT								
~1000KG	11000	10500	10000	9500	9000	8500	8000	7500	7000
76	15C/148/51/56	2C/148/52/57							
74	41C/142/44/48	40C/140/45/49	31C/138/48/53	15C/139/48/52					
72	45C/141/44/48	44C/139/44/47	43C/135/44/48	41C/133/40/44	40C/130/41/45	25C/129/42/46	8C/129/42/46		
70	49C/140/44/48	48C/138/44/48	46C/135/40/43	45C/132/40/43	44C/129/40/43	42C/126/37/41	40C/122/36/40	21C/123/36/40	1C/123/36/40
68	52C/140/40/43	51C/137/39/42	50C/134/39/42	49C/131/39/43	48C/128/39/43	46C/125/36/39	44C/121/34/38	38C/120/34/38	17C/120/34/38
66	56C/139/39/42	55C/137/38/41	54C/134/38/41	53C/131/38/41	52C/127/38/42	50C/125/35/38	48C/121/33/36	45C/118/32/36	35C/117/32/36
64	60C/138/39/42	59C/136/38/41	58C/133/37/40	57C/130/37/40	55C/127/33/36	54C/124/33/36	53C/120/33/37	50C/117/30/34	44C/115/30/34
62	63C/136/36/38	62C/134/34/37	61C/132/33/35	60C/130/32/35	59C/126/32/35	58C/123/32/35	57C/120/32/35	55C/116/29/32	49C/114/28/32
60	67C/136/36/38	66C/134/34/36	65C/132/32/34	64C/129/31/34	63C/125/31/33	62C/122/31/33	61C/119/31/33	59C/116/27/30	55C/113/26/30
58	69C/130/30/32	69C/131/31/33	69C/131/33/35	68C/128/31/34	67C/125/30/32	66C/122/29/32	65C/118/29/32	63C/115/26/28	60C/112/24/27
56	69C/119/23/25	69C/120/23/25	69C/122/23/25	69C/123/23/26	69C/124/24/26	69C/121/25/28	68C/117/25/27	67C/114/24/27	63C/112/22/25
54	69C/116/21/23	69C/116/21/23	69C/116/21/23	69C/116/21/23	69C/116/21/23	69C/116/21/23	69C/115/21/23	69C/113/21/23	65C/112/20/23
52	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/113/19/22	68C/112/19/22
50	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/114/19/22	69C/112/19/22
48	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/112/19/22
46	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/113/19/22
44	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/114/19/22

Max Temp/V1/VR/V2

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RCMQ RCTP RJBB RJCC RJFF RJFR RJGG RJSS RJTT RKSI
ROAH RPLC RPLL RPVM VGHS VHHH VMMC VTBD VTBS VTBU
VTSP VTSS VVDN VVNB VVTS WBKL WBSB WMKP ZBAA ZBSJ
ZGHA ZGKL ZGNN ZGSD ZGSZ ZHHH ZJHK ZJSY ZSAM ZSFZ
ZSHC ZSNJ ZSPD ZSQD ZSSS ZYTX

1005 hPa / 5 KT Tail wind TOGA/CONF 2/AC OFF/WET

TOW	TORA ~ FT								
~1000KG	11000	10500	10000	9500	9000	8500	8000	7500	7000
76									
74									
72									
70									
68									
66	42C/141/41/45	41C/140/41/45	37C/140/41/45	19C/141/42/46					
64	46C/140/40/44	45C/139/39/43	44C/138/39/43	42C/134/35/39	41C/133/37/41	26C/132/35/40	5C/133/36/40		
62	50C/138/39/43	49C/138/38/42	48C/137/37/41	46C/133/33/37	45C/132/33/37	43C/129/30/34	41C/125/29/33	32C/123/31/36	10C/124/33/37
60	54C/136/37/40	53C/135/36/39	52C/134/35/39	51C/134/35/38	49C/130/31/35	47C/128/28/32	45C/125/26/30	44C/121/29/33	42C/117/28/32
58	57C/131/31/34	57C/133/34/37	56C/132/33/36	55C/131/32/35	54C/130/31/35	52C/127/28/32	50C/124/26/30	48C/120/25/29	46C/117/23/28
56	61C/129/29/32	61C/131/32/35	60C/130/31/34	59C/129/30/33	58C/128/29/32	56C/125/26/29	55C/123/26/30	53C/119/24/28	51C/116/23/27
54	65C/127/28/30	64C/126/26/29	64C/128/29/32	63C/127/28/31	62C/126/27/30	61C/125/26/29	59C/122/23/26	57C/119/20/24	56C/115/22/26
52	69C/126/27/29	68C/125/25/28	67C/123/24/27	67C/125/26/29	66C/124/25/28	65C/123/24/27	64C/121/24/27	62C/118/20/23	60C/114/18/22
50	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/117/19/22	69C/119/20/23	69C/122/23/25	68C/120/21/24	66C/115/19/22	65C/113/19/22
48	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/112/19/22
46	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/113/19/22
44	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/115/19/22	69C/114/19/22

Max Temp/V1/VR/V2

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RCKH RJAA RJOA RKPK RKSS VDPP VECC VIDP VILK VLVT WBKK ZBTJ ZGGG ZLXY ZSNB ZUCK ZUUU ZYTL

990 hPa / 5 KT Tail wind

TOGA / CONF 2 / AC OFF / DRY

TOW	TORA ~ FT								
~1000KG	11000	10500	10000	9500	9000	8500	8000	7500	7000
76	21C/153/53/57	15C/154/54/59	6C/155/55/60						
74	41C/148/48/53	40C/147/47/51	40C/149/49/53	35C/147/47/52	17C/147/48/52				
72	45C/149/49/53	45C/151/51/55	43C/146/46/50	42C/144/44/48	41C/143/44/48	39C/140/41/45	23C/139/42/46	3C/139/42/46	
70	49C/149/49/53	48C/147/47/51	47C/146/46/49	46C/144/44/48	44C/141/41/44	43C/140/40/44	41C/137/38/41	37C/134/36/40	13C/134/36/40
68	52C/145/45/49	52C/147/47/51	51C/146/46/49	50C/144/44/48	48C/140/40/44	47C/139/39/42	45C/136/36/40	43C/133/35/38	35C/131/34/38
66	56C/145/45/49	55C/143/43/47	55C/146/46/49	54C/144/44/47	52C/139/39/42	51C/138/38/41	49C/135/35/39	47C/133/33/36	43C/130/32/36
64	59C/142/42/45	59C/144/44/47	58C/142/42/45	57C/140/40/43	56C/138/38/41	55C/137/37/40	54C/136/36/39	52C/132/33/37	49C/129/31/34
62	63C/144/44/47	62C/140/40/43	61C/138/38/41	61C/140/40/43	60C/138/38/41	59C/136/36/39	58C/135/35/38	56C/131/31/34	54C/129/29/32
60	66C/139/39/41	65C/136/36/39	65C/138/38/40	64C/136/36/38	64C/138/38/41	63C/136/36/39	62C/134/34/37	60C/130/30/33	58C/127/27/30
58	68C/132/32/34	68C/133/33/35	68C/135/35/37	68C/137/37/39	67C/134/34/36	67C/137/37/39	66C/134/34/37	64C/129/29/31	62C/126/26/29
56	68C/122/23/25	68C/123/23/26	68C/124/24/26	68C/124/24/27	68C/125/25/27	68C/126/26/28	68C/127/27/29	68C/128/28/31	67C/127/27/29
54	68C/116/21/23	68C/116/21/23	68C/116/21/23	68C/116/21/23	68C/116/21/23	68C/116/21/23	68C/116/21/23	68C/117/21/23	68C/119/21/23
52	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22
50	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22
48	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22
46	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22
44	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22

Max Temp/V1/VR/V2

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RCMQ RCTP RJBB RJCC RJFF RJFR RJGG RJSS RJTT RKSI
ROAH RPLC RPLL RPVM VGHS VHHH VMMC VTBD VTBS VTBU
VTSP VTSS VVDN VVNB VVTS WBKL WBSB WMKP ZBAA ZBSJ
ZGHA ZGKL ZGNN ZGSD ZGSZ ZHHH ZJHK ZJSY ZSAM ZSFZ
ZSHC ZSNJ ZSPD ZSQD ZSSS ZYTX

990 hPa / 5 KT Tail wind

TOGA / CONF 2 / AC OFF / DRY

TOW	TORA ~ FT								
~1000KG	11000	10500	10000	9500	9000	8500	8000	7500	7000
76									
74									
72									
70									
68									
66	40C/143/43/47	39C/142/42/46	31C/146/46/51	7C/147/47/52					
64	44C/142/42/46	43C/141/41/45	42C/140/40/44	41C/140/40/44	40C/140/40/44	39C/140/40/44	22C/142/42/47		
62	48C/141/41/44	47C/140/40/43	46C/139/39/43	45C/138/38/42	44C/138/38/42	43C/138/38/42	42C/138/38/42	41C/139/39/43	39C/135/35/39
60	52C/138/38/42	51C/137/37/41	50C/137/37/40	49C/136/36/40	48C/136/36/40	47C/136/36/39	46C/136/36/40	45C/136/36/40	43C/133/33/37
58	56C/136/36/39	55C/135/35/38	54C/134/34/37	53C/133/33/37	52C/133/33/36	51C/133/33/36	50C/133/33/37	49C/133/33/37	48C/134/34/38
56	60C/134/34/37	59C/132/32/36	58C/131/31/34	57C/130/30/34	56C/130/30/33	55C/129/29/33	54C/129/29/33	53C/129/29/33	52C/130/30/34
54	64C/133/33/35	63C/130/30/33	62C/129/29/32	61C/128/28/31	60C/127/27/30	59C/127/27/30	59C/131/31/34	58C/131/31/34	56C/126/26/29
52	67C/126/26/29	67C/129/29/31	66C/127/27/30	65C/126/26/29	64C/125/25/28	64C/128/28/31	63C/128/28/31	62C/127/27/30	61C/127/27/30
50	68C/115/19/22	68C/117/19/22	68C/119/19/22	68C/121/21/24	68C/123/23/26	68C/127/27/29	67C/125/25/28	66C/124/24/27	65C/124/24/27
48	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/116/19/22	68C/118/19/22
46	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22
44	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22

Max Temp/V1/VR/V2

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RCKH RJAA RJOA RKPK RKSS VDPP VECC VIDP VILK VLVT WBKK ZBTJ ZGGG ZLXY ZSNB ZUCK ZUUU ZYTL

990 hPa / 5 KT Tail wind

TOGA/CONF 2/AC OFF/WET

TOW	TORA ~ FT								
~1000KG	11000	10500	10000	9500	9000	8500	8000	7500	7000
76	6C/149/51/56								
74	39C/142/44/48	36C/139/48/52	20C/140/47/52	7C/139/49/54					
72	43C/141/43/47	42C/138/43/47	41C/135/43/47	40C/132/44/48	34C/130/43/47	17C/130/43/47	0C/130/43/47		
70	47C/140/44/47	46C/137/44/47	44C/135/40/43	43C/132/39/43	42C/128/40/43	40C/125/37/40	35C/123/37/40	15C/123/36/40	
68	51C/139/44/48	49C/137/39/42	48C/134/39/42	47C/131/39/42	46C/128/39/42	44C/125/36/39	42C/121/35/38	32C/120/34/38	11C/120/34/38
66	54C/138/38/41	53C/136/37/40	52C/133/37/40	51C/130/38/41	50C/127/38/41	48C/124/34/38	46C/120/33/36	42C/118/32/36	29C/117/32/36
64	58C/138/38/41	57C/135/37/40	56C/132/36/39	55C/129/36/39	54C/126/36/39	52C/123/33/36	50C/120/31/34	48C/117/30/34	41C/114/30/34
62	62C/137/38/40	61C/134/37/39	60C/131/36/39	59C/129/36/38	58C/125/36/39	56C/123/31/34	55C/119/31/34	53C/116/28/32	47C/114/28/32
60	65C/134/34/37	64C/132/32/35	63C/131/31/33	62C/128/30/33	61C/125/30/32	60C/122/30/32	59C/118/30/32	57C/115/27/30	52C/112/26/30
58	68C/131/31/33	68C/132/32/35	67C/130/30/33	66C/127/29/31	65C/124/28/31	64C/121/28/31	63C/118/28/31	61C/115/25/27	58C/111/24/27
56	68C/121/23/25	68C/123/23/25	68C/123/23/26	68C/124/24/26	68C/124/25/27	68C/120/27/30	67C/117/27/29	65C/114/23/26	60C/112/22/25
54	68C/116/21/23	68C/116/21/23	68C/116/21/23	68C/116/21/23	68C/116/21/23	68C/116/21/23	68C/114/21/23	68C/112/21/23	62C/112/20/23
52	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/113/19/22	64C/112/19/22
50	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/113/19/22	67C/111/19/22
48	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/114/19/22	68C/112/19/22
46	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/112/19/22
44	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/113/19/22

Max Temp/V1/VR/V2

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RCMQ RCTP RJBB RJCC RJFF RJFR RJGG RJSS RJTT RKSI ROAH RPLC RPLL RPVM VGHS VHHH VMMC VTBD VTBS VTBU VTSP VTSS VVDN VVNB VVTS WBKL WBSB WMKP ZBAA ZBSJ ZGHA ZGKL ZGNN ZGSD ZGSZ ZHHH ZJHK ZJSY ZSAM ZSFZ ZSHC ZSNJ ZSPD ZSQD ZSSS ZYTX

990 hPa / 5 KT Tail wind

TOGA / CONF 2 / AC OFF / WET

TOW	TORA ~ FT								
~1000KG	11000	10500	10000	9500	9000	8500	8000	7500	7000
76									
74									
72									
70									
68									
66	40C/140/41/45	39C/140/41/45	29C/141/42/46	7C/142/43/47					
64	44C/139/40/43	43C/138/39/43	42C/138/38/42	40C/134/35/39	38C/132/36/40	18C/133/37/41			
62	48C/138/38/42	47C/137/37/41	46C/136/37/40	44C/133/33/37	43C/131/33/37	41C/128/30/34	39C/125/29/33	23C/124/32/36	1C/125/32/37
60	52C/135/36/39	51C/135/35/39	50C/134/35/38	49C/133/34/38	47C/130/31/34	45C/127/28/32	44C/124/30/34	42C/120/29/33	40C/117/28/32
58	56C/133/34/37	55C/132/33/36	54C/131/32/35	53C/131/31/35	52C/130/31/34	50C/126/28/31	48C/123/26/30	46C/120/24/28	44C/116/23/28
56	60C/131/32/35	59C/130/30/34	58C/129/29/33	57C/128/29/32	56C/128/28/32	54C/124/25/29	53C/122/25/29	51C/119/24/28	49C/115/23/27
54	64C/129/30/33	63C/128/28/31	62C/127/27/30	61C/126/26/29	60C/125/26/29	59C/124/25/28	57C/121/22/25	56C/118/23/27	54C/114/22/25
52	67C/124/25/27	67C/126/27/30	66C/125/25/28	65C/124/24/27	64C/123/23/26	63C/122/23/26	62C/121/22/25	60C/117/19/22	58C/113/18/22
50	68C/115/19/22	68C/115/19/22	68C/117/19/22	68C/119/20/22	68C/121/22/24	68C/123/24/27	66C/119/20/23	65C/117/20/23	63C/112/18/22
48	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/114/19/22	67C/112/19/22
46	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/112/19/22
44	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/115/19/22	68C/113/19/22

Max Temp/V1/VR/V2

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RCKH RJAA RJOA RKPK RKSS VDPP VECC VIDP VILK VLVT WBKK ZBTJ ZGGG ZLXY ZSNB ZUCK ZUUU ZYTL

DragonAir A320

RTOW EDNO : 730

Group B chart

(2011/04/29)

1005 hPa

TOGA/CONF 1/PACKS OFF/DRY

TOW	Wind Component ~ KT				
~1000KG	10 KT TAIL	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
76					
74					
72					
70					
68					
66				10C 154/54/55	26C 153/53/55
64		16C 151/51/53	29C 148/48/49	30C 147/47/49	31C 147/47/49
62	27C 143/43/45	30C 142/42/44	33C 142/42/44	34C 143/43/44	35C 143/43/45
60	32C 140/40/42	35C 142/42/43	38C 144/44/46	39C 146/46/48	39C 140/40/42
58	37C 141/41/42	39C 138/38/39	42C 139/39/41	43C 141/41/42	44C 142/42/43
56	41C 136/36/37	44C 139/39/40	46C 135/35/36	47C 136/36/37	48C 137/37/38
54	46C 136/36/37	48C 133/33/34	51C 136/36/37	52C 139/39/40	52C 133/33/34
52	50C 130/30/31	53C 135/35/36	55C 132/32/33	56C 135/35/35	56C 130/30/31
50	55C 131/31/32	57C 130/30/31	59C 129/29/30	60C 131/31/32	60C 128/28/28
48	59C 126/26/27	60C 123/23/23	60C 116/20/21	60C 115/20/21	60C 115/20/21
46	60C 113/17/18	60C 113/17/18	60C 113/17/18	60C 113/17/18	60C 113/17/18
44	60C 113/16/18	60C 113/16/18	60C 113/16/18	60C 113/16/18	60C 113/16/18

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

1005 hPa

TOGA/CONF 1/PACKS OFF/DRY

TOW	Wind Component ~ KT				
~1000KG	10 KT TAIL	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
76					
74					5C 158/58/60
72			23C 150/51/54	27C 150/50/53	28C 151/51/53
70		26C 145/45/48	31C 149/50/53	32C 150/51/53	33C 152/52/54
68	28C 140/44/46	32C 145/46/48	35C 148/48/50	36C 149/49/51	37C 150/51/53
66	33C 141/41/43	37C 147/47/49	39C 146/46/48	40C 147/48/49	41C 149/49/51
64	38C 141/42/44	41C 145/45/47	43C 144/45/46	44C 146/46/47	45C 147/47/49
62	43C 143/44/46	45C 143/43/45	47C 142/43/44	48C 144/44/45	49C 146/46/47
60	47C 140/41/42	49C 141/41/42	51C 140/41/42	52C 142/42/44	53C 146/46/47
58	51C 138/38/39	53C 139/39/40	55C 139/40/41	56C 142/42/43	56C 139/39/40
56	55C 136/36/37	57C 137/37/38	59C 139/39/40	59C 136/36/37	60C 138/38/39
54	59C 134/34/36	60C 132/32/33	60C 127/27/28	60C 125/27/28	60C 123/27/28
52	60C 123/24/26	60C 117/24/26	60C 117/24/26	60C 117/24/26	60C 117/24/26
50	60C 116/22/23	60C 116/22/23	60C 116/22/23	60C 116/22/23	60C 116/22/23
48	60C 114/19/21	60C 114/19/21	60C 114/19/21	60C 114/19/21	60C 114/19/21
46	60C 113/16/18	60C 113/16/18	60C 113/16/18	60C 113/16/18	60C 113/16/18
44	60C 113/16/18	60C 113/16/18	60C 113/16/18	60C 113/16/18	60C 113/16/18

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

1005 hPa

TOGA/CONF 1/PACKS OFF/WET

TOW	Wind Component ~ KT				
~1000KG	10 KT TAIL	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
76					
74					
72					
70					
68					
66				1C 146/49/51	14C 145/48/50
64			27C 138/41/43	28C 139/41/42	30C 141/43/45
62	1C 133/40/42	27C 131/36/38	32C 136/38/40	33C 137/39/41	34C 138/39/41
60	29C 126/35/37	33C 131/34/36	37C 136/38/40	38C 137/39/41	39C 138/40/41
58	34C 126/31/33	37C 129/31/33	41C 134/35/37	42C 134/36/37	43C 135/37/38
56	39C 125/31/32	42C 128/30/32	46C 133/35/36	47C 134/36/37	48C 135/37/38
54	44C 124/29/31	47C 127/29/31	51C 133/36/37	51C 131/32/33	52C 132/33/34
52	49C 123/27/29	52C 127/29/30	55C 131/32/33	56C 133/34/35	56C 129/30/31
50	53C 121/23/24	56C 124/25/26	59C 127/28/29	60C 129/30/31	60C 126/27/28
48	58C 120/22/23	60C 121/22/23	60C 115/20/21	60C 115/20/21	60C 115/20/21
46	60C 113/17/18	60C 113/17/18	60C 113/17/18	60C 113/17/18	60C 113/17/18
44	60C 113/16/18	60C 113/16/18	60C 113/16/18	60C 113/16/18	60C 113/16/18

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

1005 hPa

TOGA / CONF 1 / PACKS OFF / WET

TOW	Wind Component ~ KT				
~1000KG	10 KT TAIL	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
76					
74					
72			0C 142/51/54	11C 141/53/55	21C 140/51/53
70		5C 134/48/51	28C 135/48/51	29C 137/46/48	30C 138/45/48
68	13C 127/44/47	28C 128/42/45	32C 134/42/45	33C 135/42/45	34C 137/42/45
66	30C 123/42/45	33C 128/40/42	36C 133/40/42	37C 134/40/42	38C 136/40/42
64	34C 122/38/40	37C 127/38/40	41C 132/43/45	42C 134/43/44	43C 135/43/45
62	38C 120/35/38	42C 126/40/42	45C 132/38/40	46C 133/38/40	47C 135/39/41
60	43C 121/33/36	46C 126/34/36	49C 131/35/37	50C 132/36/37	51C 133/37/38
58	47C 119/31/33	50C 125/31/33	53C 130/33/35	54C 131/34/36	55C 132/35/37
56	52C 119/30/32	55C 124/34/36	57C 128/31/33	58C 130/33/34	59C 131/34/35
54	56C 119/27/28	59C 123/31/32	60C 125/27/28	60C 123/27/28	60C 121/27/28
52	60C 117/24/26	60C 117/24/26	60C 117/24/26	60C 117/24/26	60C 117/24/26
50	60C 114/22/23	60C 116/22/23	60C 116/22/23	60C 116/22/23	60C 116/22/23
48	60C 114/19/21	60C 114/19/21	60C 114/19/21	60C 114/19/21	60C 114/19/21
46	60C 113/16/18	60C 113/16/18	60C 113/16/18	60C 113/16/18	60C 113/16/18
44	60C 113/15/18	60C 113/15/18	60C 113/15/18	60C 113/15/18	60C 113/15/18

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

990 hPa

TOGA/CONF 1/PACKS OFF/DRY

TOW	Wind Component ~ KT				
~1000KG	10 KT TAIL	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
76					
74					
72					
70					
68					
66					2C 155/55/57
64			26C 147/47/49	27C 147/47/48	28C 146/46/48
62	20C 148/48/50	28C 146/46/48	31C 144/44/46	32C 145/45/46	33C 146/46/47
60	30C 143/43/44	33C 146/46/47	35C 140/40/41	36C 141/41/42	37C 141/41/43
58	34C 137/37/39	37C 139/39/40	40C 142/42/43	41C 143/43/45	41C 138/38/39
56	39C 137/37/39	42C 142/42/43	44C 136/36/37	45C 137/37/38	46C 139/39/39
54	44C 138/38/39	46C 134/34/35	49C 138/38/38	49C 133/33/34	50C 134/34/35
52	48C 131/31/32	51C 136/36/36	53C 132/32/33	54C 135/35/35	54C 131/31/31
50	53C 131/31/32	55C 130/30/31	57C 129/29/29	58C 131/31/31	59C 134/34/35
48	57C 126/26/27	59C 126/26/27	60C 122/22/23	60C 121/21/21	60C 119/20/21
46	60C 119/19/20	60C 113/17/18	60C 113/17/18	60C 113/17/18	60C 113/17/18
44	60C 112/16/17	60C 112/16/17	60C 112/16/17	60C 112/16/17	60C 112/16/17

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

990 hPa

TOGA/CONF 1/PACKS OFF/DRY

TOW	Wind Component ~ KT				
~1000KG	10 KT TAIL	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
76					
74					
72			9C 152/53/55	20C 152/53/55	25C 151/52/54
70		16C 147/49/51	28C 149/49/51	30C 152/52/55	31C 153/53/55
68	25C 140/45/48	29C 144/45/47	33C 149/49/51	34C 150/50/52	35C 152/52/54
66	31C 141/43/45	34C 144/45/47	37C 147/47/49	38C 148/48/50	39C 151/51/53
64	36C 142/43/45	38C 142/42/44	41C 145/45/47	42C 147/47/48	43C 149/50/51
62	40C 140/40/42	43C 144/44/46	45C 143/43/45	46C 145/45/46	47C 148/48/49
60	45C 142/42/44	47C 141/41/43	49C 141/41/43	50C 143/43/44	51C 147/47/48
58	49C 138/39/40	51C 139/39/40	53C 139/39/41	54C 142/42/43	54C 139/39/40
56	53C 136/36/37	55C 137/37/38	57C 138/38/39	57C 135/35/37	58C 138/38/39
54	57C 134/34/35	59C 136/36/37	60C 132/33/34	60C 131/31/32	60C 129/29/30
52	60C 128/28/29	60C 124/24/26	60C 118/24/26	60C 117/24/26	60C 117/24/26
50	60C 115/22/23	60C 115/22/23	60C 115/22/23	60C 115/22/23	60C 115/22/23
48	60C 114/19/21	60C 114/19/21	60C 114/19/21	60C 114/19/21	60C 114/19/21
46	60C 113/16/18	60C 113/16/18	60C 113/16/18	60C 113/16/18	60C 113/16/18
44	60C 112/15/17	60C 112/15/17	60C 112/15/17	60C 112/15/17	60C 112/15/17

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

990 hPa

TOGA / CONF 1 / PACKS OFF / WET

TOW	Wind Component ~ KT				
~1000KG	10 KT TAIL	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
76					
74					
72					
70					
68					
66					
64			18C 139/42/44	25C 139/41/42	27C 140/43/45
62		23C 132/38/40	29C 136/38/39	31C 138/40/42	32C 139/41/42
60	26C 126/35/37	30C 130/34/36	34C 135/36/38	35C 135/37/38	37C 138/41/43
58	31C 124/31/33	35C 129/32/34	39C 134/36/38	40C 135/37/38	41C 136/38/39
56	36C 123/29/31	40C 129/31/33	44C 133/36/37	45C 135/37/38	46C 136/38/39
54	41C 123/27/28	45C 127/30/31	48C 130/32/33	49C 131/33/33	50C 132/33/34
52	46C 122/25/26	50C 127/29/30	53C 131/32/33	54C 132/34/35	54C 129/30/31
50	51C 121/23/24	54C 124/25/26	57C 127/28/29	58C 129/30/31	59C 132/33/33
48	56C 120/22/23	59C 124/26/26	60C 121/22/22	60C 119/20/21	60C 117/20/21
46	60C 117/18/19	60C 113/17/18	60C 113/17/18	60C 113/17/18	60C 113/17/18
44	60C 112/16/17	60C 112/16/17	60C 112/16/17	60C 112/16/17	60C 112/16/17

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

990 hPa

TOGA / CONF 1 / PACKS OFF / WET

TOW	Wind Component ~ KT				
~1000KG	10 KT TAIL	5 KT TAIL	0 KT	5 KT HEAD	10 KT HEAD
76					
74					
72					6C 143/53/56
70			24C 135/48/50	26C 136/46/48	27C 138/45/47
68		25C 128/42/45	30C 134/45/48	31C 135/44/47	32C 137/44/46
66	27C 123/42/45	30C 126/40/42	34C 133/41/43	35C 134/41/43	36C 136/41/43
64	32C 122/39/42	35C 127/38/41	38C 132/38/40	39C 134/38/40	40C 135/39/41
62	36C 121/36/38	39C 126/36/38	42C 131/36/38	44C 132/42/44	44C 134/37/39
60	41C 120/37/39	44C 125/38/39	47C 130/36/38	48C 132/37/38	49C 133/38/39
58	45C 119/31/33	48C 124/32/34	51C 129/33/35	52C 131/34/36	53C 132/36/37
56	50C 119/32/34	52C 123/29/31	55C 128/31/33	56C 129/33/34	57C 131/34/35
54	54C 118/27/29	57C 123/31/33	59C 127/30/31	60C 128/31/32	60C 128/30/31
52	58C 117/24/26	60C 121/24/26	60C 117/24/26	60C 117/24/26	60C 117/24/26
50	60C 113/22/23	60C 115/22/23	60C 115/22/23	60C 115/22/23	60C 115/22/23
48	60C 114/19/21	60C 114/19/21	60C 114/19/21	60C 114/19/21	60C 114/19/21
46	60C 113/16/18	60C 113/16/18	60C 113/16/18	60C 113/16/18	60C 113/16/18
44	60C 112/15/17	60C 112/15/17	60C 112/15/17	60C 112/15/17	60C 112/15/17

Max Temp/V1/VR/V2

- Use actual wind component and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use actual wind and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

1005 hPa / 5 KT Tail wind TOGA/CONF 2/AC OFF/DRY

TOW	TORA ~ FT								
~1000KG	11000	10500	10000	9500	9000	8500	8000	7500	7000
90	12C/160/63/63								
88	27C/157/59/59	26C/154/59/60	24C/151/57/58	8C/151/58/60					
86	30C/155/55/56	29C/154/54/55	28C/150/54/55	27C/147/55/56	25C/143/52/53	11C/142/51/53			
84	34C/155/56/57	33C/154/54/55	32C/151/53/55	31C/148/55/56	29C/145/50/52	27C/141/47/49	25C/138/45/48	5C/138/45/47	
82	38C/157/58/58	37C/155/55/56	36C/153/53/54	35C/150/53/54	33C/147/49/50	32C/143/49/51	30C/140/46/48	27C/137/42/44	12C/135/41/44
80	41C/156/57/57	40C/153/53/54	39C/151/51/52	38C/150/50/51	37C/146/49/51	35C/143/45/47	33C/140/42/45	31C/136/41/43	26C/133/39/42
78	44C/156/56/57	43C/152/52/53	42C/150/50/51	41C/148/48/49	40C/145/46/48	39C/143/46/47	37C/139/42/44	35C/136/40/42	31C/133/38/41
76	47C/157/57/57	46C/151/51/52	45C/148/48/49	44C/146/46/48	43C/144/44/46	42C/142/43/45	41C/138/43/44	39C/135/39/41	35C/131/36/39
74	49C/148/48/49	49C/151/51/51	48C/147/47/48	47C/145/45/46	46C/143/43/44	45C/141/41/43	44C/138/41/43	42C/134/37/39	40C/131/35/37
72	52C/151/51/51	51C/145/45/46	51C/147/47/48	50C/143/43/45	49C/141/41/42	48C/139/39/41	47C/137/38/40	45C/134/35/37	43C/129/33/36
70	54C/145/45/46	54C/148/48/48	53C/142/42/43	53C/145/45/46	52C/141/41/42	51C/138/38/40	50C/135/36/38	49C/132/35/37	47C/129/32/34
68	56C/141/41/42	56C/142/43/43	56C/145/45/45	55C/139/40/41	55C/141/41/42	54C/138/38/40	53C/135/36/37	52C/131/34/36	50C/128/29/32
66	56C/128/30/32	56C/129/30/32	56C/130/31/33	56C/131/32/33	56C/132/33/34	56C/133/34/35	56C/134/38/39	55C/130/34/36	53C/127/28/30
64	56C/118/25/28	56C/118/25/28	56C/118/25/28	56C/118/25/28	56C/119/25/28	56C/122/25/28	56C/122/26/28	56C/124/26/29	56C/125/27/29
62	56C/117/23/26	56C/117/23/26	56C/117/23/26	56C/117/23/26	56C/117/23/26	56C/117/23/26	56C/117/23/26	56C/117/23/26	56C/117/23/26
60	56C/116/21/24	56C/116/21/24	56C/116/21/24	56C/116/21/24	56C/116/21/24	56C/116/21/24	56C/116/21/24	56C/116/21/24	56C/116/21/24
58	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23
56	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23
54	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23
52	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23
50	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23

Max Temp/V1/VR/V2

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RCMQ RCTP RJAA RJBB RJCC RJFF RJFR RJGG RJSS RJTT
RKSI ROAH RPLC RPLL RPVM VDPP VGHS VHHH VMMC VTBD
VTBS VTBU VTSS VVDN VVNB VVTS WBKL WBSB WMKP ZBAA
ZBSJ ZGHA ZGKL ZGNN ZGSD ZGSZ ZHHH ZJHK ZSAM ZSFZ
ZSHC ZSNJ ZSPD ZSQD ZSSS ZYTX

1005 hPa / 5 KT Tail wind — TOGA / CONF 2 / AC OFF / DRY

TOW ~1000KG	TORA ~ FT 11000	10500	10000	9500	9000	8500	8000	7500	7000
90									
88									
86									
84									
82									
80	7C/157/58/59								
78	27C/149/50/52	26C/149/49/52	25C/149/51/53	20C/153/54/56					
76	31C/149/49/51	30C/148/49/51	29C/148/48/51	28C/148/48/51	27C/148/49/51	26C/150/51/53	23C/147/49/52		
74	35C/151/51/53	34C/149/50/52	33C/149/49/51	32C/148/49/52	31C/150/51/53	29C/143/43/46	28C/143/44/47	26C/141/42/45	18C/139/42/45
72	38C/144/44/47	37C/143/44/46	36C/142/43/45	35C/142/43/45	34C/142/43/45	33C/142/43/46	32C/142/43/46	30C/139/40/43	28C/137/38/41
70	41C/140/40/43	41C/145/45/47	40C/143/43/46	39C/142/43/45	38C/141/42/44	37C/141/42/44	36C/141/42/45	34C/138/38/41	32C/135/36/39
68	45C/143/43/45	44C/140/41/43	43C/138/39/41	42C/137/38/41	42C/143/43/46	41C/143/44/46	40C/142/43/45	38C/136/37/40	36C/134/34/37
66	48C/138/38/40	47C/136/36/39	47C/141/41/43	46C/139/39/41	45C/138/38/40	44C/136/37/40	43C/135/36/39	42C/135/36/39	40C/132/32/35
64	51C/135/35/37	51C/141/41/42	50C/135/36/38	49C/133/34/37	48C/132/33/36	48C/138/39/41	47C/137/38/40	46C/136/37/39	44C/131/32/35
62	54C/134/34/36	53C/131/31/33	53C/134/34/36	52C/131/31/34	52C/137/37/39	51C/133/33/36	50C/131/32/34	49C/130/31/34	48C/130/30/33
60	56C/127/28/30	56C/129/30/32	56C/133/33/35	55C/129/31/33	54C/127/28/31	54C/131/32/35	53C/128/29/32	52C/127/28/30	52C/131/32/34
58	56C/116/20/23	56C/116/20/23	56C/119/20/23	56C/121/21/24	56C/122/23/26	56C/124/25/28	56C/127/28/31	55C/125/26/29	55C/129/30/32
56	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/118/20/23
54	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23
52	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23
50	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23

Max Temp/V1/VR/V2

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RCKH RJOA RKPK RKSS VECC VIDP VILK VLVT VTSP WBKK ZBTJ ZGGG ZJSY ZLXY ZSNB ZUCK ZUUU ZYTL

DragonAir A321

RTOW EDNO : 733

Group B chart

(2011/04/29)

1005 hPa / 5 KT Tail wind TOGA/CONF 2/AC OFF/WET

TOW ~1000KG	TORA ~ FT 11000	10500	10000	9500	9000	8500	8000	7500	7000
90									
88	25C/147/55/57	22C/144/58/59	8C/144/59/60						
86	29C/146/56/57	28C/143/56/57	26C/140/51/53	25C/136/51/53	17C/134/53/54	0C/135/53/55			
84	32C/146/51/53	31C/143/51/52	30C/139/51/52	29C/136/51/53	27C/132/48/50	26C/129/48/50	16C/128/46/48		
82	36C/145/53/54	35C/142/52/53	34C/139/52/53	33C/136/52/54	31C/133/47/49	29C/130/44/46	27C/126/42/45	21C/123/41/44	0C/124/41/44
80	39C/145/49/51	38C/142/48/50	37C/139/48/49	36C/135/48/49	35C/132/48/49	33C/129/44/46	31C/125/41/44	28C/122/40/42	13C/121/39/43
78	42C/144/48/49	41C/141/46/47	40C/138/45/46	39C/135/44/46	38C/131/44/46	37C/128/44/46	35C/125/41/43	32C/121/38/41	25C/119/37/41
76	45C/143/47/48	44C/141/45/46	43C/138/43/45	42C/134/42/43	41C/131/41/43	40C/127/41/43	39C/124/40/42	36C/120/36/39	30C/118/36/39
74	48C/142/45/46	47C/140/43/44	46C/137/41/43	45C/134/40/42	44C/130/39/41	43C/127/38/40	42C/123/38/40	40C/120/35/38	35C/117/34/37
72	51C/142/45/46	50C/139/42/43	49C/136/39/41	49C/133/43/45	48C/129/42/43	47C/126/41/43	45C/123/36/38	43C/118/33/36	39C/116/33/36
70	53C/139/41/42	53C/139/42/43	52C/135/39/40	51C/132/36/38	51C/129/41/42	50C/125/37/39	49C/122/36/38	47C/118/33/35	44C/115/31/34
68	56C/140/41/42	55C/136/38/39	55C/135/39/40	54C/132/36/37	53C/129/33/35	53C/125/38/39	52C/121/35/37	50C/118/30/32	49C/114/29/32
66	56C/127/30/32	56C/128/31/32	56C/128/31/33	56C/130/32/34	56C/128/33/35	55C/124/31/33	55C/121/36/37	53C/116/29/31	52C/113/28/30
64	56C/118/25/28	56C/118/25/28	56C/118/25/28	56C/118/25/28	56C/118/25/28	56C/120/25/28	56C/120/25/28	56C/115/27/30	55C/112/26/29
62	56C/117/23/26	56C/117/23/26	56C/117/23/26	56C/117/23/26	56C/117/23/26	56C/117/23/26	56C/116/23/26	56C/114/23/26	56C/112/23/26
60	56C/116/21/24	56C/116/21/24	56C/116/21/24	56C/116/21/24	56C/116/21/24	56C/116/21/24	56C/116/21/24	56C/115/21/24	56C/113/21/24
58	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/115/20/23	56C/113/20/23
56	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/113/20/23
54	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/114/21/24
52	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/114/20/23
50	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/115/20/23

Max Temp/V1/VR/V2

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RCMQ RCTP RJAA RJBB RJCC RJFF RJFR RJGG RJSS RJTT
RKSI ROAH RPLC RPLL RPVM VDPP VGHS VHHH VMMC VTBD
VTBS VTBU VTSS VVDN VVNB VVTS WBKL WBSB WMKP ZBAA
ZBSJ ZGHA ZGKL ZGNN ZGSD ZGSZ ZHHH ZJHK ZSAM ZSFZ
ZSHC ZSNJ ZSPD ZSQD ZSSS ZYTX

1005 hPa / 5 KT Tail wind TOGA/CONF 2/AC OFF/WET

TOW ~1000KG	TORA ~ FT 11000	10500	10000	9500	9000	8500	8000	7500	7000
90									
88									
86									
84									
82									
80									
78	27C/148/51/53	26C/147/51/53	25C/145/51/54	9C/145/52/54					
76	31C/148/52/53	30C/146/51/53	29C/144/50/52	27C/140/45/48	25C/137/43/46	14C/136/46/49			
74	34C/143/45/48	33C/142/45/47	32C/141/44/47	31C/139/44/47	29C/136/41/44	27C/133/39/42	25C/130/38/42	13C/128/43/46	
72	38C/143/46/48	37C/142/45/47	36C/140/44/46	35C/138/43/46	33C/135/40/43	31C/132/37/41	29C/129/35/39	27C/125/35/39	25C/121/35/39
70	41C/139/42/44	40C/137/40/43	40C/141/45/47	39C/138/43/46	37C/134/39/41	35C/131/36/39	34C/128/38/41	32C/124/37/41	29C/120/32/36
68	44C/136/38/41	44C/140/42/44	43C/137/40/42	42C/135/38/41	41C/133/37/40	39C/130/34/37	38C/127/35/39	36C/123/34/37	34C/119/33/37
66	48C/137/39/41	47C/135/37/40	46C/133/36/38	46C/136/41/43	44C/131/34/37	43C/129/33/36	42C/126/34/37	40C/122/31/35	38C/118/30/34
64	51C/134/36/38	50C/130/34/36	50C/134/37/39	49C/132/35/37	48C/130/33/36	47C/128/33/36	45C/125/30/33	44C/122/31/34	42C/118/28/31
62	54C/133/36/37	53C/129/32/34	53C/134/36/38	52C/129/32/35	51C/128/30/33	50C/126/29/32	49C/124/28/31	48C/121/29/32	46C/117/27/30
60	56C/125/28/31	56C/128/31/33	55C/125/28/31	55C/128/31/34	54C/125/29/31	54C/127/32/35	53C/124/30/33	51C/120/24/28	50C/116/24/28
58	56C/116/20/23	56C/116/20/23	56C/117/20/23	56C/118/21/24	56C/119/24/26	56C/122/25/28	56C/122/29/31	55C/119/29/31	53C/116/21/24
56	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/21/24	56C/113/21/24
54	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/114/21/24
52	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/114/20/23
50	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/116/20/23	56C/115/20/23

Max Temp/V1/VR/V2

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RCKH RJOA RKPK RKSS VECC VIDP VILK VLVT VTSP WBKK ZBTJ ZGGG ZJSY ZLXY ZSNB ZUCK ZUUU ZYTL

990 hPa / 5 KT Tail wind

TOGA / CONF 2 / AC OFF / DRY

TOW	TORA ~ FT								
~1000KG	11000	10500	10000	9500	9000	8500	8000	7500	7000
90									
88	25C/156/59/60	23C/153/58/59	8C/153/59/60						
86	28C/155/55/56	27C/153/54/55	26C/150/55/56	24C/145/53/54	16C/144/53/55				
84	32C/155/56/57	31C/153/54/55	30C/151/54/55	29C/147/55/56	27C/144/50/51	25C/141/47/49	16C/139/46/49		
82	36C/157/58/58	35C/154/55/56	34C/152/54/55	33C/149/53/54	31C/146/49/51	30C/143/49/51	27C/140/43/46	24C/135/41/44	5C/136/41/44
80	39C/154/55/56	38C/152/53/54	37C/150/51/52	36C/148/49/51	35C/146/49/50	33C/143/45/47	31C/139/42/45	29C/136/41/43	23C/133/39/42
78	42C/153/54/54	41C/150/51/52	41C/152/52/53	39C/146/47/48	38C/145/46/47	37C/142/45/47	35C/139/42/44	33C/135/40/42	28C/132/38/41
76	45C/152/53/53	44C/149/49/50	44C/151/51/52	43C/148/49/50	41C/143/44/45	40C/141/42/44	39C/138/42/44	37C/134/39/41	33C/131/36/39
74	48C/151/52/52	47C/148/48/49	47C/150/50/50	46C/147/47/48	45C/144/45/47	43C/140/40/42	42C/137/39/41	40C/134/36/38	37C/130/35/37
72	50C/145/45/46	50C/148/48/48	49C/144/44/45	49C/145/46/47	48C/143/43/44	47C/140/42/43	45C/137/37/39	44C/133/37/39	41C/129/33/36
70	53C/149/49/50	52C/143/43/44	52C/145/45/46	51C/141/41/42	50C/138/38/40	50C/139/40/41	49C/135/39/41	47C/132/34/36	45C/128/32/34
68	55C/143/44/44	55C/146/46/46	54C/140/41/42	54C/142/43/44	53C/139/39/40	52C/136/36/37	51C/133/34/35	50C/129/33/35	49C/128/31/33
66	55C/130/31/33	55C/131/32/33	55C/132/32/34	55C/133/34/35	55C/134/35/36	55C/135/36/37	54C/132/33/35	53C/129/31/33	52C/126/30/32
64	55C/118/25/28	55C/118/25/28	55C/118/25/28	55C/121/25/28	55C/123/25/28	55C/124/26/28	55C/125/27/29	55C/126/27/30	55C/126/28/30
62	55C/117/23/26	55C/117/23/26	55C/117/23/26	55C/117/23/26	55C/117/23/26	55C/117/23/26	55C/117/23/26	55C/117/23/26	55C/118/23/26
60	55C/116/21/24	55C/116/21/24	55C/116/21/24	55C/116/21/24	55C/116/21/24	55C/116/21/24	55C/116/21/24	55C/116/21/24	55C/116/21/24
58	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23
56	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23
54	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23
52	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23
50	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23

Max Temp/V1/VR/V2

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RCMQ RCTP RJAA RJBB RJCC RJFF RJFR RJGG RJSS RJTT
RKSI ROAH RPLC RPLL RPVM VDPP VGHS VHHH VMMC VTBD
VTBS VTBU VTSS VVDN VVNB VVTS WBKL WBSB WMKP ZBAA
ZBSJ ZGHA ZGKL ZGNN ZGSD ZGSZ ZHHH ZJHK ZSAM ZSFZ
ZSHC ZSNJ ZSPD ZSQD ZSSS ZYTX

DragonAir A321

RTOW EDNO : 735

Group A chart

(2011/04/29)

990 hPa / 5 KT Tail wind

TOGA / CONF 2 / AC OFF / DRY

TOW	TORA ~ FT								
~1000KG	11000	10500	10000	9500	9000	8500	8000	7500	7000
90									
88									
86									
84									
82									
80									
78	25C/149/50/52	24C/150/52/54	19C/153/54/56						
76	29C/149/49/51	28C/148/49/51	27C/147/48/50	26C/148/48/51	25C/148/49/52	23C/149/50/52	1C/151/52/54		
74	33C/151/52/53	32C/149/50/52	31C/149/50/52	30C/149/51/53	29C/148/49/51	27C/143/44/46	26C/144/44/47	24C/141/43/46	4C/142/43/46
72	36C/144/44/46	35C/142/44/46	35C/149/50/52	34C/149/50/51	32C/142/43/46	31C/142/43/46	30C/142/44/46	28C/139/40/43	26C/137/38/41
70	40C/145/45/47	39C/143/44/46	38C/142/43/45	37C/141/42/44	36C/141/42/44	35C/141/42/45	34C/141/42/45	32C/137/38/41	30C/135/36/39
68	43C/140/40/42	42C/138/39/41	42C/142/43/45	41C/143/44/46	40C/141/43/45	39C/141/42/44	38C/140/42/44	36C/136/37/40	34C/133/34/37
66	47C/142/42/44	46C/140/40/42	45C/138/39/41	44C/136/38/40	43C/135/37/39	42C/135/36/39	42C/141/41/44	40C/134/35/38	39C/134/35/38
64	50C/138/38/40	49C/134/35/37	49C/139/40/41	48C/138/39/41	47C/136/37/39	46C/135/36/38	45C/134/35/38	44C/134/35/37	43C/133/34/37
62	52C/131/31/33	52C/133/33/36	51C/130/31/33	51C/135/35/37	50C/131/32/35	49C/130/31/33	49C/135/36/38	48C/133/34/37	46C/129/29/32
60	55C/130/30/32	55C/134/34/36	54C/129/30/32	54C/134/34/36	53C/130/31/33	52C/128/28/31	52C/132/33/35	51C/129/30/33	50C/128/29/31
58	55C/118/19/23	55C/120/20/23	55C/121/21/24	55C/122/23/25	55C/124/25/27	55C/126/28/30	55C/132/32/34	54C/128/29/32	53C/126/27/29
56	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/117/19/23	55C/120/23/26
54	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23
52	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23
50	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23

Max Temp/V1/VR/V2

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RCKH RJOA RKPK RKSS VECC VIDP VILK VLVT VTSP WBKK ZBTJ ZGGG ZJSY ZLXY ZSNB ZUCK ZUUU ZYTL

DragonAir A321

RTOW EDNO : 737

Group B chart

(2011/04/29)

990 hPa / 5 KT Tail wind TOGA/CONF 2/AC OFF/WET

TOW	TORA ~ FT								
~1000KG	11000	10500	10000	9500	9000	8500	8000	7500	7000
90									
88	21C/146/60/61	7C/146/60/61							
86	27C/145/56/57	26C/142/56/57	24C/139/52/53	20C/136/56/57	3C/137/55/57				
84	30C/145/51/53	29C/142/51/52	28C/139/51/52	27C/135/51/53	25C/132/48/50	23C/129/47/49	5C/129/47/50		
82	34C/145/52/53	33C/142/51/52	32C/139/51/53	31C/135/53/54	29C/132/47/49	27C/129/44/47	25C/126/43/45	14C/124/41/44	
80	37C/144/49/50	36C/141/48/49	35C/138/47/49	34C/135/47/49	33C/131/47/49	31C/128/43/46	29C/125/41/44	25C/122/39/42	7C/122/39/43
78	40C/143/47/48	40C/140/51/52	39C/137/49/51	37C/134/43/45	36C/131/43/45	35C/127/43/45	33C/124/40/43	30C/121/38/41	21C/119/37/41
76	43C/142/45/46	43C/140/48/49	42C/137/47/48	41C/133/45/47	40C/130/45/46	38C/127/40/42	37C/123/40/42	34C/119/36/39	27C/117/36/39
74	46C/141/44/45	46C/139/46/47	45C/136/45/46	44C/133/44/45	43C/129/42/44	42C/126/41/43	40C/123/37/39	38C/119/35/37	32C/116/34/37
72	49C/140/42/43	49C/138/44/45	48C/135/42/43	47C/132/40/42	46C/129/39/41	45C/125/39/40	43C/122/35/37	42C/118/34/37	37C/115/33/36
70	52C/140/43/44	51C/137/39/41	51C/134/43/44	50C/132/39/40	49C/128/36/38	48C/125/35/37	47C/121/35/37	45C/118/32/34	42C/115/31/34
68	54C/137/39/40	54C/137/40/41	53C/134/37/38	53C/131/40/41	52C/128/37/38	51C/124/34/36	50C/121/32/34	49C/117/31/33	46C/113/29/32
66	55C/129/31/33	55C/130/32/33	55C/131/33/34	55C/130/34/35	54C/127/31/33	54C/124/34/36	53C/120/32/34	52C/117/30/32	50C/112/27/30
64	55C/118/25/28	55C/118/25/28	55C/118/25/28	55C/119/25/28	55C/122/25/28	55C/123/26/28	55C/119/27/29	55C/115/30/32	53C/112/25/28
62	55C/117/23/26	55C/117/23/26	55C/117/23/26	55C/117/23/26	55C/117/23/26	55C/117/23/26	55C/116/23/26	55C/114/23/26	55C/111/23/26
60	55C/116/21/24	55C/116/21/24	55C/116/21/24	55C/116/21/24	55C/116/21/24	55C/116/21/24	55C/116/21/24	55C/114/21/24	55C/112/21/24
58	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/114/19/23	55C/112/19/23
56	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/20/23	55C/113/20/23
54	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/113/20/23
52	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/114/19/23
50	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/114/19/23

Max Temp/V1/VR/V2

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RCMQ RCTP RJAA RJBB RJCC RJFF RJFR RJGG RJSS RJTT
RKSI ROAH RPLC RPLL RPVM VDPP VGHS VHHH VMMC VTBD
VTBS VTBU VTSS VVDN VVNB VVTS WBKL WBSB WMKP ZBAA
ZBSJ ZGHA ZGKL ZGNN ZGSD ZGSZ ZHHH ZJHK ZSAM ZSFZ
ZSHC ZSNJ ZSPD ZSQD ZSSS ZYTX

DragonAir A321

RTOW EDNO : 736

Group A chart

(2011/04/29)

990 hPa / 5 KT Tail wind

TOGA / CONF 2 / AC OFF / WET

TOW	TORA ~ FT								
~1000KG	11000	10500	10000	9500	9000	8500	8000	7500	7000
90									
88									
86									
84									
82									
80									
78	25C/148/51/53	24C/147/54/55	11C/147/54/56						
76	29C/148/51/53	28C/146/50/52	26C/142/46/48	25C/140/46/48	20C/138/46/49				
74	32C/142/46/48	31C/142/45/47	30C/140/45/47	29C/139/44/46	27C/136/41/44	25C/133/39/43	21C/129/43/46		
72	36C/142/46/48	35C/141/45/47	34C/140/44/46	33C/138/43/45	31C/135/40/43	29C/132/37/40	27C/128/36/39	25C/124/35/39	18C/121/38/42
70	40C/144/47/48	39C/141/44/46	38C/139/43/45	37C/137/42/45	35C/133/38/41	33C/130/35/39	32C/127/39/42	30C/123/38/41	27C/120/32/36
68	43C/139/42/44	42C/137/40/42	41C/135/39/41	40C/134/37/40	39C/132/37/39	38C/130/39/41	36C/126/35/38	34C/122/34/37	32C/118/33/37
66	46C/134/37/40	46C/140/42/44	45C/137/40/42	44C/134/38/40	43C/132/36/39	41C/128/32/35	40C/125/33/36	38C/122/31/34	36C/118/30/34
64	49C/130/33/36	49C/133/36/38	48C/131/34/37	48C/135/40/42	47C/132/37/39	45C/127/32/34	44C/125/33/35	42C/121/29/32	40C/117/27/31
62	52C/129/32/34	52C/132/35/37	51C/129/32/34	51C/133/37/39	50C/129/33/35	49C/126/31/34	48C/124/31/34	46C/120/27/31	44C/116/25/29
60	55C/128/31/33	54C/125/28/31	54C/128/31/33	53C/125/28/31	53C/128/31/33	52C/125/29/31	51C/123/27/30	50C/120/26/29	48C/116/23/26
58	55C/116/19/23	55C/117/20/23	55C/118/22/24	55C/119/24/26	55C/122/25/28	55C/124/28/30	54C/122/25/28	53C/119/24/27	52C/115/24/28
56	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/20/23	55C/114/21/24
54	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/113/20/23
52	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/114/19/23
50	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/115/19/23	55C/114/19/23

Max Temp/V1/VR/V2

- Use available TORA and actual OAT to find TOW. Takeoff not allowed if TOW < ATOW.
- Use available TORA and ATOW to find V1, VR and V2.
- Maximum rated thrust (TOGA) must be used.

Data valid for the following ports provided no WIP or temporary obstructions affect the active runway.
RCKH RJOA RKPK RKSS VECC VIDP VILK VLVT VTSP WBKK ZBTJ ZGGG ZJSY ZLXY ZSNB ZUCK ZUUU ZYTL

DragonAir A321

RTOW EDNO : 738

Group B chart

(2011/04/29)