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## 1. RATINGS OF THE JT8D-217A

### a) Takeoff Thrust

Two thrust levels have been certified for this engine:

- **Normal Takeoff Thrust**

This is the thrust value normally used for takeoff with Automatic Reserve Thrust (ART) operative.

- **Maximum Takeoff Thrust**

This is the highest value applicable for takeoff when ART is inoperative.

### b) Go-Around Thrust

This is the same rating as Maximum Takeoff Thrust.

### c) Maximum Climb Thrust (MCL)

This is the maximum thrust available for climb. All climb charts are based on MCL.

### d) Maximum Cruise Thrust (MCR)

Maximum allowable thrust in cruise with both engines operating.

### e) Maximum Continuous Thrust (MCT)

Maximum thrust which may be used continuously in case of one engine failure.

### f) Bleed corrections

Whenever necessary EPR corrections are given to account for bleed and anti-ice configurations.

## 2. SPEED REGIMES

- The climb speed schedule is:

250 KIAS below 10000 ft

290 KIAS up to 26900 ft

.72 MACH above 26900 ft

- The schedule cruise speeds are:

250 KIAS (FL50 to 90)

300 KIAS (FL100 to 270)

.75 MACH (FL280 to 370)

LRC (FL50 to 370)

- The speed schedule 300 KIAS / .75 MACH is recommended as standard economical cruising. LRC is used for the diversion to the alternate.


- The schedule descent speeds are:

A) Mach .75 above 33900 ft; 260 KIAS below 33900 ft; 250 KIAS below 10000 ft

B) Mach .75 above 29000 ft; 290 KIAS below 29000 ft; 250 KIAS below 10000 ft


Schedule "A" is recommended from the economy fuel standpoint.

Schedule "B" shall be used for normal operations and for flight planning.

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### 3. RCAM

Runway Contaminant	PIREP	Friction Coefficient	Braking Action	COND Selection in PERF	Maximum Wind Components	
					XW	TW
Dry	Dry			DRY	Aircraft Limits	Aircraft Limits
Damp Wet, up to 3mm (1/8") of water Slush, up to 3mm (1/8") Dry snow, up to 3mm (1/8") Wet snow, up to 3mm (1/8") Frost	Good	> .39	95	GOOD	Aircraft Limits	Aircraft Limits
Compacted snow (OAT at or below -15°)	Good to Medium	.36 - .39	94	GOOD/MED	20kts	10kts
Compacted snow (OAT above -15°) Dry snow, more than 3mm (1/8") Wet snow, more than 3mm (1/8") Dry/Wet snow over compacted snow Slippery when wet	Medium	.30 - .35	93	MED	20kts	10kts
Water, more than 3mm (1/8") Slush, more than 3mm (1/8")	Medium to Poor	.26 - .29	92	MED/POOR	10kts	0
Ice	Poor	.20 - .25	91	<b>TAKEOFF AND LANDING NOT ALLOWED</b>		
--	Unreliable	< .20	//			

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## 4. MOTNE

RUNWAY DESIGNATOR		EXAMPLE
Single Runways	RWY 23	<u>R23</u> /590738
Multiple Runways (Parallel runways are designated by letters L (left), C (center), and R (right runway))		
	RWY 23R	<u>R23R</u> /590738
	RWY 23C	<u>R23C</u> /590738
R88 is used for all runways at Airport		<u>R88</u> /590738
R99 means a repetition of the last message due to missing new report		<u>R99</u> /590738
TYPE OF RUNWAY DEPOSIT		EXAMPLE
0 = Clear and dry 1 = Damp 2 = Wet or water patches 3 = Rime or frost (depth normally less than 1mm) 4 = Dry snow 5 = Wet snow	6 = Slush 7 = Ice 8 = Compact or rolled snow  9 = Frozen ruts or ridges / = Type of deposit not reported (e.g. due to runway clearance in progress)	R33/ <u>5</u> 90738
EXTENT OF RUNWAY CONTAMINATION		EXAMPLE
1 = ≤ 10 % 2 = 11 – 25 % 5 = 26 – 50 %	9 = ≥ 51 % / = Not reported (e.g. due to runway clearance in progress)	R33/ <u>5</u> 90738 R33/5/ <u>0</u> 738
DEPTH OF DEPOSIT RUNWAY		EXAMPLE
00 = < 1 mm 01 – 90 = depth in mm 92 = 10 cm 93 = 15 cm 94 = 20 cm	95 = 25 cm 96 = 30 cm 97 = 35 cm 98 = 40 cm or more	R33/59 <u>0</u> 738 R33/59/ <u>0</u> 738
99 = Runway not operational due to snow, slush, ice, large drifts or runway clearance // = Depth of deposit operationally not significant or not measurable		
FRICTION COEFFICIENT (FC) OR BRAKING ACTION (BA)		EXAMPLE
FC denoted in two digits, e.g. 38 = FC 0.38		R33/5907 <u>38</u>
If FC is not avail, BA will be denoted in two digits, e.g. 93 = BA 93		
95 = Good 94 = Good to medium 93 = Medium	92 = Medium to poor 91 = Poor	R33/5907 <u>93</u>
99 = Unreliable (FC or BA where the measurement is not satisfactory or reliable. This may be the case when a runway is contaminated with wet snow, slush or loose snow). // = Braking action not reported; Runway not operational, Aerodrome closed etc.		R33/5907 <u>99</u> R33/5907//

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## 5. FLEXIBLE TAKEOFF THRUST

### a) General

The MTOW values given in the Runway Length Limitation tables are based on the use of the "NORMAL T.O. THRUST".

Although the "NORMAL T.O. THRUST" is already lower than the maximum usable, an additional reduction in thrust will furthermore improve the engine life.

Therefore, whenever the "ACTUAL TOW" is lower than the "MTOW", it is recommended the use of the "FLX T.O. THRUST".

The procedure is based upon the determination of a higher "assumed temperature" for which the performance limited takeoff weight is equal to the actual takeoff weight. This "assumed temperature" is used instead of the actual temperature to determine the T.O. EPR.

### b) Operating Limitations

Flexible takeoff thrust is only allowed when:

- Runway weight limitation table is available.
- The runway is not contaminated by Snow, Slush or standing Water.
- De-icing/Anti-icing fluid has not been used.
- ART system is OFF.
- Airfoil A/I is not used.
- All EPR gauges are operative.

### c) Method for determining reduced T.O. EPR

The method has to be used in conjunction with Fixed Flap given in Runway tables for DRY and WET runway conditions.

1) Determine the max temperature (Assumed TEMP) at which  $MTOW \geq ACT\ TOW$ .

When QNH is different from 1013hpa, apply the ACT TOW correction as described below, before determining the "Assumed TEMP".


2) Check if ACT OAT is equal to or lower than the value between brackets just under the "Assumed TEMP" found.

**ACT OAT is equal or lower:**

The "Assumed TEMP" shall be used in determining the T.O. EPR.

**ACT OAT is greater than the max value or NA is found:**

In this case the FLX T.O. is not allowed and NORMAL T.O. must be used.

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Weight Correction:

		DRY	WET
QNH < 1013	(kg/hpa)	-80	-80
QNH > 1013	(kg/hpa)	+30	+30

Max  $\Delta$  hpa is 2 for table 1800m, 1 for tables 2300m÷3300m, 0 for table 3800m.

Explanation of the table fields

DRY		FLAP 15 ①			
OAT °C	WIND (kt)				
	-10	-5 ②	0	10	
③	NO T/O	56.4 ⑥			
④	⑤	14.0 ⑦			


- ① Flap settings to be used
- ② Tail (negative) or head (positive) wind component
- ③ Assumed Temperature
- ④ Actual OAT limit. If actual OAT is higher than this value, or NA is found, FLEX T.O. is not allowed.
- ⑤ When NO T/O is found, take off is not permitted due to tail wind component
- ⑥ Actual TOW
- ⑦ One engine out attitude (deg)

Examples (use table for 2300m)

Example 1

GIVEN:      Rwy Cond.   DRY  
                  OAT            17°  
                  Wind           -6 kt  
                  QNH            1013 hpa  
                  ACT TOW    60 ton

FIND:        a) Determine the max temp (Assumed Temp) at which MTOW ≥ ACT TOW from -10 kt wind column: 31° (MTOW=60.1 ton, -10 kt wind column)  
                  b) Check if Act OAT is equal or lower than the value in brackets: in this case N.A. is found so FLEX T.O. cannot be used.

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### Example 2

GIVEN: Rwy Cond. DRY  
OAT 21°  
Wind 0 kt  
QNH 1003 hpa  
ACT TOW 56 ton

FIND: Since QNH is different from 1013 a correction to Act TOW is required before determining the Assumed Temp:  $56000 + (80 \times 10) = 56800$  kg.

a) Assumed Temp = 45° (MTOW=57.0)

b) Check if Act OAT is equal or lower than the value in brackets: 21° is lower than 37° so the Assumed Temp can be used to calculate take off thrust for a FLEX T.O.

### Example 3

GIVEN: Rwy Cond. WET  
OAT 27°  
Wind +11 kt  
QNH 1017 hpa  
ACT TOW 60 ton


FIND: a) Assumed Temp = 37° (MTOW=60.3, 10 kt wind column)

b) Check if Act OAT is equal or lower than the value in brackets: 27° is lower than 30° so the Assumed Temp can be used to calculate take off thrust for a FLEX T.O.

### NOTE

In real life airlines compile Runway Tables for each runway that is flown by their MD82 fleet.

The values on the tables are calculated taking into account not only the runway length, but also the slope, the presence of obstacles, etc. Since it is impossible for us to provide the data for every runway we have simplified the tables in order to take into account only the field length. A real Runway Table will also give the corrected  $V_1$ ,  $V_R$  and  $V_2$  values for the specific runway/condition that we have omitted.

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## Runway Length: 6000ft – 1800m

<b>DRY FLAP 15</b>				
OAT °C	-10	WIND (kt)		
		-5	0	10
27 (NA)	NO T/O	56.4 14.0	58.8 13.5	60.1 13.5
29 (NA)	NO T/O	56.2 14.0	58.5 13.5	59.8 13.5
31 (NA)	NO T/O	55.7 14.0	58.0 13.5	59.3 13.5
33 (NA)	NO T/O	55.2 14.0	57.5 13.5	58.7 13.5
35 (NA)	NO T/O	54.7 14.0	56.9 13.5	58.2 13.5
37 (30)	NO T/O	54.1 14.0	56.3 13.5	57.6 13.5
39 (32)	NO T/O	53.6 14.0	55.7 13.5	56.9 13.5
41 (33)	NO T/O	53.0 14.0	55.1 13.5	56.3 13.5
43 (35)	NO T/O	52.3 14.0	54.4 13.5	55.6 13.5
45 (37)	NO T/O	51.7 14.0	53.8 13.5	54.9 13.5
47 (39)	NO T/O	51.1 13.5	53.1 13.5	54.3 13.0
49 (41)	NO T/O	50.6 13.5	52.6 13.5	53.7 13.0
49		50.0 14.0	52.0 13.5	53.0 13.5
49		48.0 14.0	50.0 14.0	51.0 13.5
49		46.0 14.5	48.0 14.0	49.0 14.0
49		44.0 15.0	46.0 14.5	47.0 14.5
49		42.0 15.5	44.0 15.0	45.0 14.5
49		40.0 15.5	42.0 15.5	43.0 15.0
49			40.0 15.5	41.0 15.5

<b>WET FLAP 15</b>				
OAT °C	-10	WIND (kt)		
		-5	0	10
-10 (NA)	NO T/O	NO T/O	60.6 13.5	61.9 13.0
-5 (NA)	NO T/O	NO T/O	60.1 13.5	61.3 13.0
0 (NA)	NO T/O	NO T/O	59.5 13.5	60.9 13.5
5 (NA)	NO T/O	NO T/O	59.0 13.5	60.4 13.5
10 (NA)	NO T/O	NO T/O	58.8 13.5	60.1 13.5
15 (NA)	NO T/O	NO T/O	58.3 13.5	59.6 13.5
15			58.0 13.5	59.0 13.5
15			56.0 14.0	57.0 14.0
15			54.0 14.0	55.0 14.0
15			52.0 14.5	53.0 14.5
15			50.0 15.0	51.0 14.5
15			48.0 15.5	49.0 15.0
15			46.0 15.5	47.0 15.5
15			44.0 15.5	45.0 15.5
15			42.0 15.5	43.0 15.5
15			40.0 15.5	41.0 15.5

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**Runway Length: 7500ft – 2300m**

<b>DRY</b>		<b>FLAP 15</b>			
<b>OAT °C</b>		<b>WIND (kt)</b>			
		<b>-10</b>	<b>-5</b>	<b>0</b>	<b>10</b>
27		<b>60.9</b>	<b>62.5</b>	<b>63.2</b>	<b>63.6</b>
(NA)		13.5	13.0	13.0	13.0
29		<b>60.7</b>	<b>62.5</b>	<b>63.1</b>	<b>63.5</b>
(NA)		13.5	13.0	13.0	13.0
31		<b>60.1</b>	<b>61.8</b>	<b>62.4</b>	<b>62.8</b>
(NA)		13.5	13.0	13.0	13.0
33		<b>59.6</b>	<b>61.1</b>	<b>61.7</b>	<b>62.1</b>
(NA)		13.5	13.0	13.0	13.0
35		<b>59.0</b>	<b>60.3</b>	<b>61.0</b>	<b>61.4</b>
(NA)		13.0	13.0	13.0	13.0
37		<b>58.4</b>	<b>59.4</b>	<b>60.1</b>	<b>60.5</b>
(30)		13.0	13.0	13.0	13.0
39		<b>57.8</b>	<b>58.7</b>	<b>59.3</b>	<b>59.7</b>
(32)		13.0	13.0	13.0	13.0
41		<b>57.1</b>	<b>58.0</b>	<b>58.6</b>	<b>58.9</b>
(33)		13.0	13.0	13.0	13.0
43		<b>56.4</b>	<b>57.2</b>	<b>57.8</b>	<b>58.2</b>
(35)		13.0	13.0	13.0	13.0
45		<b>55.7</b>	<b>56.4</b>	<b>57.0</b>	<b>57.4</b>
(37)		13.0	13.0	13.0	13.0
47		<b>54.8</b>	<b>55.5</b>	<b>56.1</b>	<b>56.5</b>
(39)		13.0	13.0	13.0	13.0
49		<b>53.9</b>	<b>54.5</b>	<b>55.2</b>	<b>55.6</b>
(41)		13.0	13.0	13.0	13.0
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49		<b>53.0</b>	<b>54.0</b>	<b>55.0</b>	<b>55.0</b>
		13.5	13.0	13.0	13.0
49		<b>51.0</b>	<b>52.0</b>	<b>53.0</b>	<b>53.0</b>
		13.5	13.5	13.5	13.5
49		<b>49.0</b>	<b>50.0</b>	<b>51.0</b>	<b>51.0</b>
		14.0	14.0	13.5	13.5
49		<b>47.0</b>	<b>48.0</b>	<b>49.0</b>	<b>49.0</b>
		14.5	14.0	14.0	14.0
49		<b>45.0</b>	<b>46.0</b>	<b>47.0</b>	<b>47.0</b>
		14.5	14.5	14.5	14.5
49		<b>43.0</b>	<b>44.0</b>	<b>45.0</b>	<b>45.0</b>
		15.0	15.0	14.5	14.5
49		<b>41.0</b>	<b>42.0</b>	<b>43.0</b>	<b>43.0</b>
		15.5	15.5	15.0	15.0
49			<b>40.0</b>	<b>41.0</b>	<b>41.0</b>
			15.5	15.5	15.5

<b>WET</b>		<b>FLAP 15</b>			
<b>OAT °C</b>		<b>WIND (kt)</b>			
		<b>-10</b>	<b>-5</b>	<b>0</b>	<b>10</b>
-10		<b>61.7</b>	<b>62.4</b>	<b>63.1</b>	<b>63.4</b>
(NA)		13.0	13.0	13.0	13.0
-5		<b>61.6</b>	<b>62.4</b>	<b>63.0</b>	<b>63.4</b>
(NA)		13.0	13.0	13.0	13.0
0		<b>61.6</b>	<b>62.4</b>	<b>63.0</b>	<b>63.4</b>
(NA)		13.0	13.0	13.0	13.0
5		<b>61.4</b>	<b>62.4</b>	<b>63.0</b>	<b>63.4</b>
(NA)		13.0	13.0	13.0	13.0
10		<b>61.3</b>	<b>62.4</b>	<b>63.0</b>	<b>63.4</b>
(NA)		13.0	13.0	13.0	13.0
15		<b>60.8</b>	<b>62.3</b>	<b>63.0</b>	<b>63.4</b>
(NA)		13.5	13.0	13.0	13.0
20		<b>60.3</b>	<b>62.2</b>	<b>63.0</b>	<b>63.4</b>
(NA)		13.5	13.0	13.0	13.0
25		<b>59.8</b>	<b>61.8</b>	<b>63.0</b>	<b>63.3</b>
(NA)		13.5	13.0	13.0	13.0
27		<b>59.6</b>	<b>61.6</b>	<b>63.0</b>	<b>63.3</b>
(NA)		13.5	13.0	13.0	13.0
29		<b>59.3</b>	<b>61.3</b>	<b>62.9</b>	<b>63.3</b>
(NA)		13.5	13.0	13.0	13.0
31		<b>58.8</b>	<b>60.8</b>	<b>62.2</b>	<b>62.6</b>
(NA)		13.5	13.0	13.0	13.0
33		<b>58.3</b>	<b>60.3</b>	<b>61.5</b>	<b>61.9</b>
(NA)		13.5	13.0	13.0	13.0
35		<b>57.7</b>	<b>59.7</b>	<b>60.7</b>	<b>61.1</b>
(NA)		13.5	13.0	13.0	13.0
37		<b>57.1</b>	<b>59.0</b>	<b>59.9</b>	<b>60.3</b>
(30)		13.5	13.0	13.0	13.0
39		<b>56.4</b>	<b>58.3</b>	<b>59.1</b>	<b>59.5</b>
(32)		13.5	13.0	13.0	13.0
41		<b>55.7</b>	<b>57.6</b>	<b>58.3</b>	<b>58.7</b>
(33)		13.5	13.0	13.0	13.0
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41		<b>55.0</b>	<b>57.0</b>	<b>58.0</b>	<b>58.0</b>
		13.5	13.0	13.0	13.0
41		<b>53.0</b>	<b>55.0</b>	<b>56.0</b>	<b>56.0</b>
		14.0	13.5	13.5	13.5
41		<b>51.0</b>	<b>53.0</b>	<b>54.0</b>	<b>54.0</b>
		14.0	14.0	13.5	13.5
41		<b>49.0</b>	<b>51.0</b>	<b>52.0</b>	<b>52.0</b>
		14.5	14.0	14.0	14.0
41		<b>47.0</b>	<b>49.0</b>	<b>50.0</b>	<b>50.0</b>
		15.0	14.5	14.5	14.5
41		<b>45.0</b>	<b>47.0</b>	<b>48.0</b>	<b>48.0</b>
		15.5	15.0	14.5	14.5
41		<b>43.0</b>	<b>45.0</b>	<b>46.0</b>	<b>46.0</b>
		15.5	15.5	15.0	15.0



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**Runway Length: 9000ft – 2800m**

<b>DRY</b>		<b>FLAP 15</b>			
<b>OAT</b>		<b>WIND (kt)</b>			
<b>°C</b>		<b>-10</b>	<b>-5</b>	<b>0</b>	<b>10</b>
27		<b>62.5</b>	<b>63.7</b>	<b>64.8</b>	<b>65.4</b>
(NA)		13.0	13.0	13.0	13.0
29		<b>62.4</b>	<b>63.5</b>	<b>64.7</b>	<b>65.3</b>
(NA)		13.0	13.0	13.0	13.0
31		<b>61.8</b>	<b>62.9</b>	<b>63.9</b>	<b>64.6</b>
(NA)		13.0	13.0	13.0	13.0
33		<b>61.1</b>	<b>62.2</b>	<b>63.2</b>	<b>63.8</b>
(NA)		13.0	13.0	13.0	13.0
35		<b>60.4</b>	<b>61.5</b>	<b>62.5</b>	<b>63.1</b>
(NA)		13.0	13.0	13.0	13.0
37		<b>59.6</b>	<b>60.7</b>	<b>61.7</b>	<b>62.3</b>
(30)		13.0	13.0	13.0	13.0
39		<b>58.8</b>	<b>59.9</b>	<b>60.9</b>	<b>61.5</b>
(32)		13.0	13.0	13.0	13.0
41		<b>58.1</b>	<b>59.1</b>	<b>60.2</b>	<b>60.8</b>
(33)		13.0	13.0	13.0	13.0
43		<b>57.3</b>	<b>58.4</b>	<b>59.3</b>	<b>59.9</b>
(35)		13.0	13.0	13.0	13.0
45		<b>56.6</b>	<b>57.6</b>	<b>58.5</b>	<b>59.0</b>
(37)		13.0	13.0	13.0	13.0
47		<b>55.7</b>	<b>56.7</b>	<b>57.6</b>	<b>58.2</b>
(39)		13.0	13.0	13.0	13.0
49		<b>54.8</b>	<b>55.9</b>	<b>56.8</b>	<b>57.3</b>
(41)		13.0	13.0	13.0	13.0
<hr/>					
49		<b>54.0</b>	<b>55.0</b>	<b>56.0</b>	<b>57.0</b>
		13.0	13.0	13.0	13.0
49		<b>52.0</b>	<b>53.0</b>	<b>54.0</b>	<b>55.0</b>
		13.5	13.5	13.0	13.0
49		<b>50.0</b>	<b>51.0</b>	<b>52.0</b>	<b>53.0</b>
		14.0	13.5	13.5	13.5
49		<b>48.0</b>	<b>49.0</b>	<b>50.0</b>	<b>51.0</b>
		14.0	14.0	14.0	13.5
49		<b>46.0</b>	<b>47.0</b>	<b>48.0</b>	<b>49.0</b>
		14.5	14.5	14.0	14.0
49		<b>44.0</b>	<b>45.0</b>	<b>46.0</b>	<b>47.0</b>
		15.0	14.5	14.5	14.5
49		<b>42.0</b>	<b>43.0</b>	<b>44.0</b>	<b>45.0</b>
		15.5	15.0	15.0	14.5
49		<b>40.0</b>	<b>41.0</b>	<b>42.0</b>	<b>43.0</b>
		15.5	15.5	15.5	15.0
49				<b>40.0</b>	<b>41.0</b>
				15.5	15.5

<b>WET</b>		<b>FLAP 15</b>			
<b>OAT</b>		<b>WIND (kt)</b>			
<b>°C</b>		<b>-10</b>	<b>-5</b>	<b>0</b>	<b>10</b>
-10		<b>62.2</b>	<b>63.3</b>	<b>64.4</b>	<b>65.0</b>
(NA)		13.0	13.0	13.0	13.0
-5		<b>62.1</b>	<b>63.2</b>	<b>64.2</b>	<b>64.9</b>
(NA)		13.0	13.0	13.0	13.0
0		<b>62.0</b>	<b>63.1</b>	<b>64.1</b>	<b>64.8</b>
(NA)		13.0	13.0	13.0	13.0
5		<b>61.8</b>	<b>63.0</b>	<b>64.0</b>	<b>64.7</b>
(NA)		13.0	13.0	13.0	13.0
10		<b>61.8</b>	<b>62.9</b>	<b>64.0</b>	<b>64.7</b>
(NA)		13.0	13.0	13.0	13.0
15		<b>61.7</b>	<b>62.8</b>	<b>63.9</b>	<b>64.6</b>
(NA)		13.0	13.0	13.0	13.0
20		<b>61.5</b>	<b>62.7</b>	<b>63.7</b>	<b>64.4</b>
(NA)		13.0	13.0	13.0	13.0
25		<b>61.4</b>	<b>62.6</b>	<b>63.6</b>	<b>64.3</b>
(NA)		13.0	13.0	13.0	13.0
27		<b>61.4</b>	<b>62.5</b>	<b>63.6</b>	<b>64.3</b>
(NA)		13.0	13.0	13.0	13.0
29		<b>61.3</b>	<b>62.4</b>	<b>63.5</b>	<b>64.1</b>
(NA)		13.0	13.0	13.0	13.0
31		<b>60.6</b>	<b>61.8</b>	<b>62.8</b>	<b>63.4</b>
(NA)		13.0	13.0	13.0	13.0
33		<b>59.9</b>	<b>61.1</b>	<b>62.1</b>	<b>62.7</b>
(NA)		13.0	13.0	13.0	13.0
35		<b>59.2</b>	<b>60.4</b>	<b>61.4</b>	<b>62.0</b>
(NA)		13.0	13.0	13.0	13.0
37		<b>58.4</b>	<b>59.6</b>	<b>60.6</b>	<b>61.3</b>
(30)		13.0	13.0	13.0	13.0
39		<b>57.7</b>	<b>58.8</b>	<b>59.9</b>	<b>60.5</b>
(32)		13.0	13.0	13.0	13.0
41		<b>57.0</b>	<b>58.1</b>	<b>59.1</b>	<b>59.7</b>
(33)		13.0	13.0	13.0	13.0
<hr/>					
41		<b>55.0</b>	<b>58.0</b>	<b>59.0</b>	<b>59.0</b>
		13.5	13.0	13.0	13.0
41		<b>53.0</b>	<b>56.0</b>	<b>57.0</b>	<b>57.0</b>
		14.0	13.5	13.0	13.0
41		<b>51.0</b>	<b>54.0</b>	<b>55.0</b>	<b>55.0</b>
		14.0	13.5	13.5	13.5
41		<b>49.0</b>	<b>52.0</b>	<b>53.0</b>	<b>53.0</b>
		14.5	14.0	14.0	14.0
41		<b>47.0</b>	<b>50.0</b>	<b>51.0</b>	<b>51.0</b>
		15.0	14.5	14.0	14.0
41		<b>45.0</b>	<b>48.0</b>	<b>49.0</b>	<b>49.0</b>
		15.0	14.5	14.5	14.5
41		<b>43.0</b>	<b>46.0</b>	<b>47.0</b>	<b>47.0</b>
		15.5	15.0	15.0	15.0

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**Runway Length: 11000ft – 3300m**

<b>DRY</b>		<b>FLAP 15</b>			
<b>OAT</b>		<b>WIND (kt)</b>			
<b>°C</b>		<b>-10</b>	<b>-5</b>	<b>0</b>	<b>10</b>
27		68.4	68.4	68.4	68.4
(NA)					
29		68.4	68.4	68.4	68.4
(NA)					
31		67.5	67.5	67.5	67.5
(NA)					
33		66.7	66.7	66.7	66.7
(NA)		12.5	12.5	12.5	12.5
35		65.9	65.9	65.9	65.9
(NA)		12.5	12.5	12.5	12.5
37		64.9	64.9	64.9	64.9
(30)		12.5	12.5	12.5	12.5
39		64.1	64.1	64.1	64.1
(32)		12.5	12.5	12.5	12.5
41		63.2	63.2	63.2	63.2
(33)		12.5	12.5	12.5	12.5
43		62.3	62.3	62.3	62.3
(35)		12.5	12.5	12.5	12.5
45		61.5	61.5	61.5	61.5
(37)		12.5	12.5	12.5	12.5
47		60.5	60.5	60.5	60.5
(39)		12.5	12.5	12.5	12.5
49		59.5	59.5	59.5	59.5
(41)		12.5	12.5	12.5	12.5
<hr/>					
49		59.0	59.0	59.0	59.0
		12.5	12.5	12.5	12.5
49		57.0	57.0	57.0	57.0
		13.0	13.0	13.0	13.0
49		55.0	55.0	55.0	55.0
		13.0	13.0	13.0	13.0
49		53.0	53.0	53.0	53.0
		13.5	13.5	13.5	13.5
49		51.0	51.0	51.0	51.0
		13.5	13.5	13.5	13.5
49		49.0	49.0	49.0	49.0
		14.0	14.0	14.0	14.0
49		47.0	47.0	47.0	47.0
		14.5	14.5	14.5	14.5
49		45.0	45.0	45.0	45.0
		14.5	14.5	14.5	14.5
49		43.0	43.0	43.0	43.0
		15.0	15.0	15.0	15.0

<b>WET</b>		<b>FLAP 15</b>			
<b>OAT</b>		<b>WIND (kt)</b>			
<b>°C</b>		<b>-10</b>	<b>-5</b>	<b>0</b>	<b>10</b>
-10		68.0	68.0	68.0	68.0
(NA)					
-5		67.8	68.0	68.0	68.0
(NA)					
0		67.5	68.0	68.0	68.0
(NA)					
5		67.3	68.0	68.0	68.0
(NA)					
10		67.2	68.0	68.0	68.0
(NA)					
15		66.9	68.0	68.0	68.0
(NA)		12.5			
20		66.6	67.9	68.0	68.0
(NA)		12.5			
25		66.4	67.7	68.0	68.0
(NA)		12.5			
27		66.3	67.6	68.0	68.0
(NA)		12.5			
29		66.1	67.4	68.0	68.0
(NA)		12.5			
31		65.4	66.8	67.5	67.5
(NA)		12.5	12.5		
33		64.7	66.1	66.7	66.7
(NA)		12.5	12.5	12.5	12.5
35		64.0	65.3	65.9	65.9
(NA)		12.5	12.5	12.5	12.5
37		63.2	64.5	64.9	64.9
(30)		12.5	12.5	12.5	12.5
39		62.4	63.6	64.1	64.1
(32)		12.5	12.5	12.5	12.5
41		61.7	62.9	63.2	63.2
(33)		12.5	12.5	12.5	12.5
<hr/>					
41		60.0	62.0	63.0	63.0
		12.5	12.5	12.5	12.5
41		59.0	60.0	61.0	61.0
		13.0	13.0	12.5	12.5
41		57.0	58.0	59.0	59.0
		13.0	13.0	13.0	13.0
41		55.0	56.0	57.0	57.0
		13.5	13.5	13.0	13.0
41		53.0	54.0	55.0	55.0
		14.0	13.5	13.5	13.5
41		51.0	52.0	53.0	53.0
		14.0	14.0	14.0	14.0
41		49.0	50.0	51.0	51.0
		14.5	14.5	14.0	14.0

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## Runway Length: 12500ft – 3800m

DRY		FLAP 15			
OAT °C		-10	WIND (kt)		10
			-5	0	
27 (NA)		68.5	68.5	68.5	68.5
29 (NA)		68.4	68.4	68.4	68.4
31 (NA)		67.6	67.6	67.6	67.6
33 (NA)		66.7	66.7	66.7	66.7
35 (NA)		65.9	65.9	65.9	65.9
37 (30)		65.0	65.0	65.0	65.0
39 (32)		64.1	64.1	64.1	64.1
41 (33)		63.3	63.3	63.3	63.3
43 (35)		62.4	62.4	62.4	62.4
45 (37)		61.5	61.5	61.5	61.5
47 (39)		60.5	60.5	60.5	60.5
49 (41)		59.6	59.6	59.6	59.6
49		59.0	59.0	59.0	59.0
49		57.0	57.0	57.0	57.0
49		55.0	55.0	55.0	55.0
49		53.0	53.0	53.0	53.0
49		51.0	51.0	51.0	51.0
49		49.0	49.0	49.0	49.0
49		47.0	47.0	47.0	47.0
49		45.0	45.0	45.0	45.0
49		43.0	43.0	43.0	43.0

WET		FLAP 15			
OAT °C		-10	WIND (kt)		10
			-5	0	
-10 (NA)		68.0	68.0	68.0	68.0
-5 (NA)		68.0	68.0	68.0	68.0
0 (NA)		68.0	68.0	68.0	68.0
5 (NA)		68.0	68.0	68.0	68.0
10 (NA)		68.0	68.0	68.0	68.0
15 (NA)		68.0	68.0	68.0	68.0
20 (NA)		68.0	68.0	68.0	68.0
25 (NA)		68.0	68.0	68.0	68.0
27 (NA)		68.0	68.0	68.0	68.0
29 (NA)		68.0	68.0	68.0	68.0
31 (NA)		67.6	67.6	67.6	67.6
33 (NA)		66.7	66.7	66.7	66.7
35 (NA)		65.9	65.9	65.9	65.9
37 (30)		65.0	65.0	65.0	65.0
39 (32)		64.1	64.1	64.1	64.1
41 (33)		63.3	63.3	63.3	63.3
41		63.0	63.0	63.0	63.0
41		61.0	61.0	61.0	61.0
41		59.0	59.0	59.0	59.0
41		57.0	57.0	57.0	57.0
41		55.0	55.0	55.0	55.0
41		53.0	53.0	53.0	53.0
41		51.0	51.0	51.0	51.0

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**TAKEOFF SPEEDS****FLAPS / SLATS: 15 EXT**

V <sub>1</sub> V <sub>R</sub> V <sub>2</sub> (KIAS)										ANTISKID ON –A/C BLEEDS ON or OFF										FLAP RETRACTION SPEED	SLAT RETRACTION SPEED	FINAL CLIMB SPEED	
A/P P.A. (ft)	OAT (°C)																						
8001 ÷ 9000																-54 ÷ 30							
7001 ÷ 8000																-54 ÷ 32							
6001 ÷ 7000													-54 ÷ 22			23 ÷ 36							
5001 ÷ 6000													-54 ÷ 30			31 ÷ 41							
4001 ÷ 5000							-54 ÷ 23			24 ÷ 33			34 ÷ 45										
3001 ÷ 4000				-54 ÷ 22			23 ÷ 29			30 ÷ 38			39 ÷ 47										
2001 ÷ 3000				-54 ÷ 28			29 ÷ 33			34 ÷ 43			44 ÷ 49										
1001 ÷ 2000	-54 ÷ 27			28 ÷ 32			33 ÷ 38			39 ÷ 47			48 ÷ 50										
S.I. ÷ 1000	-54 ÷ 32			33 ÷ 37			38 ÷ 42			43 ÷ 50													
-1000 ÷ S.I.	-54 ÷ 36			37 ÷ 42			43 ÷ 47			48 ÷ 50													
T.O.W. (ton)	V <sub>1</sub>	V <sub>R</sub>	V <sub>2</sub>	One Eng Att.	V <sub>1</sub>	V <sub>R</sub>	V <sub>2</sub>	One Eng Att.	V <sub>1</sub>	V <sub>R</sub>	V <sub>2</sub>	One Eng Att.	V <sub>1</sub>	V <sub>R</sub>	V <sub>2</sub>	One Eng Att.	V <sub>1</sub>	V <sub>R</sub>	V <sub>2</sub>				One Eng Att.
6 8	144	147	154	12.5	147	148	154	12.5															
6 7	142	146	153	12.5	145	147	153	12.5													168	200	221
6 6	141	145	152	12.5	144	146	152	12.5	144	146	152	12.0									167	199	219
6 5	139	143	150	13.0	142	144	150	12.5	143	145	150	12.0									165	197	218
6 4	138	142	149	13.0	140	143	149	12.5	141	143	149	12.5									164	196	216
6 3	136	141	148	13.0	138	142	148	13.0	139	142	148	12.5	142	142	148	12.0					163	194	215
6 2	134	139	147	13.0	137	140	147	13.0	138	141	147	12.5	140	141	147	12.0					162	193	213
6 1	133	138	146	13.5	135	139	146	13.0	136	140	146	12.5	139	140	146	12.5					161	191	211
6 0	131	137	144	13.5	133	138	144	13.0	134	138	144	12.5	137	139	144	12.5					159	190	210
5 9	130	135	143	13.5	132	136	143	13.0	133	137	143	13.0	135	137	143	12.5					158	188	208
5 8	128	134	142	13.5	130	135	142	13.5	131	136	142	13.0	133	136	142	12.5	137	137	142	12.0	157	186	206
5 7	127	133	141	14.0	128	133	141	13.5	129	134	141	13.0	132	135	141	13.0	135	135	141	12.5	156	185	204
5 6	125	131	139	14.0	127	132	139	14.0	128	133	139	13.0	130	133	139	13.0	133	134	139	12.5	154	183	203
5 5	123	130	138	14.0	125	131	138	14.0	126	132	138	13.5	128	132	138	13.0	131	133	138	12.5	153	182	201
5 4	122	120	137	14.5	123	129	137	14.0	124	130	137	13.5	126	131	137	13.0	129	131	137	12.5	152	180	199
5 3	120	127	135	14.5	122	128	135	14.0	122	129	135	13.5	125	129	135	13.5	127	130	135	13.0	150	178	197
5 2	119	126	134	14.5	120	126	134	14.0	121	127	134	14.0	123	128	134	13.5	126	129	134	13.0	149	176	195
5 1	117	124	133	15.0	118	125	133	14.5	119	126	133	14.0	121	126	133	13.5	124	127	133	13.0	148	175	193
5 0	115	123	131	15.0	116	123	131	14.5	117	124	131	14.0	119	125	131	14.0	122	126	131	13.0	146	173	191
4 9	114	121	130	15.0	115	122	130	15.0	116	123	130	14.5	118	123	130	14.0	120	124	130	13.5	145	171	189
4 8	112	120	129	15.5	113	120	129	15.0	114	121	129	14.5	116	122	129	14.0	118	123	129	13.5	144	169	187
4 7	110	118	127	15.5	111	119	127	15.0	112	120	127	15.0	114	120	127	14.0	116	121	127	13.5	142	168	185
4 6	109	117	126	15.5	110	117	126	15.5	111	119	126	15.0	112	119	126	14.5	115	120	126	14.0	141	166	183
4 5	107	115	124	16.0	109	116	124	15.5	109	117	124	15.0	111	117	124	14.5	113	118	124	14.0	139	164	181
4 4	105	114	123	16.0	106	114	123	15.5	107	115	123	15.5	109	116	123	15.0	111	117	123	14.0	138	162	179
4 3	103	112	121	16.0	105	113	121	16.0	106	114	121	15.5	107	114	121	15.0	109	115	121	14.5	136	160	177
4 2	102	110	120	16.5	103	111	120	16.0	104	112	120	16.0	105	113	120	15.0	107	114	120	14.5	135	158	175
4 1	100	109	118	16.5	101	110	118	16.5	102	110	118	16.0	104	111	118	15.5	105	112	118	15.0	133	157	173
4 0	99	107	117	16.5	100	108	117	16.5	101	109	117	16.0	102	110	117	15.5	104	111	117	15.0	132	155	171

**V<sub>1</sub> – V<sub>R</sub> CORRECTIONS**

	WIND	SLOPE	ANTI ICE
V <sub>1</sub>	+ 0.5 kt / 10 kt HWC	+ 3 kt / 1% Uphill	Eng A/I ON : Zero
	- 0.5 kt / 10 kt TWC	- 2 kt / 1% Downhill	Eng + Airfoil A/I ON : + 0.5 kt
V <sub>R</sub>	Zero	+ 0.5 kt / 1% Uphill	Eng A/I ON : Zero
		- 0.5 kt / 1% Downhill	Eng + Airfoil A/I ON : + 0.5 kt

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## LANDING SPEEDS NORMAL CONDITIONS

LANDING WEIGHT (ton)															Flaps/Slats		V <sub>MAN</sub> (KIAS)
40	42	44	46	48	50	52	54	56	58	60	62	64	66	68			
193	198	202	207	211	216	220	224	228	232	236	240	244	248	252	UP/RET 1.5 V <sub>s</sub>		
150	154	158	161	165	168	172	175	178	182	185	188	191	194	197	0/EXT 1.5 V <sub>s</sub>		
130	133	136	139	142	145	148	150	153	156	158	161	164	166	169	15/EXT 1.4 V <sub>s</sub>		
121	124	127	130	132	135	138	141	143	146	148	151	154	156	158	28/EXT 1.4 V <sub>s</sub>		
117	120	123	125	128	130	133	135	138	140	143	145	147	149	151	28/EXT 1.3 V <sub>s</sub> + 5		V <sub>TH</sub> (KIAS)
113	116	116	121	124	126	129	131	133	136	138	140	142	144	146	40/EXT 1.3 V <sub>s</sub> + 5		
1215	1250	1290	1330	1370	1410	1450	1490	1530	1565	1610	1645	1685	1725	1765	DRY	28/EXT 1.3V <sub>s</sub> +5	Land Field Length (m)
1395	1440	1485	1530	1580	1620	1665	1710	1760	1800	1850	1890	1940	1980	2030	WET		

## ABNORMAL CONDITIONS

### SLATS RET (Abnormal Slats/No Flaps-No Slats)

LANDING WEIGHT (ton)															Flaps/Slats	V <sub>MAN</sub> (KIAS)
40	42	44	46	48	50	52	54	56	58	60	62	64	66	68		
193	198	202	207	211	216	220	224	228	232	236	240	244	248	252	UP/RET 1.5 V <sub>s</sub>	
162	166	169	173	177	180	184	187	191	194	198	201	204	208	211	15/RET 1.4 V <sub>s</sub>	
150	154	158	161	165	168	171	175	178	181	184	188	191	194	197	28/RET 1.4 V <sub>s</sub>	V <sub>TH</sub> (KIAS)
162	166	169	173	176	180	184	187	190	194	197	200	203	206	209	UP/RET 1.25 V <sub>s</sub>	
130	133	136	139	142	145	148	151	154	157	159	162	165	167	170	40/RET 1.3 V <sub>s</sub>	

### SLATS EXT (Abnormal Flaps)

LANDING WEIGHT (ton)															Flaps/Slats	V <sub>MAN</sub> (KIAS)
40	42	44	46	48	50	52	54	56	58	60	62	64	66	68		
150	154	158	161	165	168	172	175	178	182	185	188	191	194	197	0/EXT 1.5 V <sub>s</sub>	V <sub>TH</sub> (KIAS)
130	133	136	139	142	145	148	150	153	156	158	161	164	166	169	15/RET 1.4 V <sub>s</sub>	
136	139	142	146	149	153	155	158	161	163	166	169	172	175	177	0/EX 1.35 V <sub>s</sub>	V <sub>TH</sub> (KIAS)
121	124	127	129	132	135	138	141	143	146	148	151	153	156	158	15/EXT 1.3 V <sub>s</sub>	