A320 LANDING PERFORMANCE

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LANDING PERFORMANCE ASSESSMENT

Basic Steps:

1. **Determine the Approach Speed.**
2. **Determine the Landing Distance.**
3. **Determine the Factored Landing Distance.**

WITHOUT OR WITH A SINGLE FAILURE

WITH SEVERAL FAILURES

METHOD TO DETERMINE AIRCRAFT PERFORMANCE AT LANDING WITHOUT OR WITH A SINGLE FAILURE

FLAPS LEVER POSITION FOR LANDING
Select the FLAPS lever position requested by the ECAM*.

* If there are no ECAM instructions, the FLAPS lever position for landing is at the flight crew's discretion.

VAPP
Determine the VAPP.

VAPP DETERMINATION WITHOUT FAILURE

The FMGS performs the following VAPP computation for landing in normal configuration (CONF 3 or CONF FULL).

VAPP = VLS + APPR COR

VLS												
Weight (T)		40	42	46	50	54	58	62	66	70	74	78
VLS CONF FULL (kt) (=VREF)	CG < 25%	108	111	116	121	125	130	134	138	142	146	150
	CG ≥ 25%	106	109	114	119	123	128	132	136	140	144	148
VLS CONF 3 (kt)	CG < 25%	112	115	119	125	129	135	139	143	147	151	155
	CG ≥ 25%	110	113	117	123	127	133	137	141	145	149	153

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APPRoach **COR**rection
APPR COR = Highest of • 5kt in case of A/THR ON • 5kt in case of Ice Accretion in CONF FULL 10kt in case of Ice Accretion in CONF 3 • 1/3 Headwind component (excluding gust - maximum 15 kt)

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VAPP
VAPP = VLS + APPR COR

RUNWAY LANDING PERFORMANCE LEVEL - CODE

Use the Runway Condition Assessment Matrix to determine the runway landing performance level and code.

RUNWAY CONDITION ASSESSMENT MATRIX FOR LANDING

Runway Surface Conditions		Observations on Deceleration and Directional Control	Related Landing Performance		Maximum Crosswind for Landing (Gust included)
Runway State or / and Runway Contaminant	ESF[1] or PIREP[2]		Code	Level	
Dry	-	-	**6**	**DRY**	38 kt
Damp **Wet** Up to 3 mm (1/8") of water **Slush** Up to 3 mm (1/8") **Dry snow** Up to 3 mm (1/8") **Wet snow** Up to 3 mm (1/8") **Frost**	**Good**	Braking deceleration is normal for the wheel braking effort applied. Directional control is normal.	**5**	**GOOD**	38 kt

LANDING DISTANCE **(LD)**

Determine the Landing Distance **(LD)** using the appropriate Landing Distance table.

6 - DRY										
Corrections on Landing Distance (m)			WGT[2]	SPD	ALT	WIND	TEMP	SLOPE	REV	OVW
Braking Mode	LDG CONF	REF DIST (m) for 66T	Per 1T above 66T	Per 5kt	Per 1000ft above SL	Per 5kt TW	Per 10°C above ISA	Per 1% Down Slope	Per Thrust Reverser Operative	If OVW PROC applied
Maximum MANUAL	FULL	**1 090**	+ 50	+ 70	+ 40	+ 120	+ 30	+ 20	- 10	+ 780
	3	**1 170**	+ 50	+ 80	+ 40	+ 130	+ 40	+ 20	- 10	+ 940
AUTOBRAKE MED	FULL	**1 370**	+ 30	+ 90	+ 50	+ 130	+ 50	+ 10	0	+ 230
	3	**1 450**	+ 40	+ 100	+ 50	+ 140	+ 50	+ 10	0	+ 250
AUTOBRAKE LOW	FULL	**1 950**	+ 40	+ 140	+ 70	+ 200	+ 70	+ 30	- 10	+ 260
	3	**2 090**	+ 50	+ 140	+ 80	+ 210	+ 70	+ 20	- 10	+ 290

(1) Automatic Landing correction: if CONF FULL, add 280m. If CONF 3, add 300m.
(2) Weight correction: subtract 10m per 1T below 66T.

LANDING DISTANCE CORRECTION (**SPD** Column in Landing Distance table)

					6 - DRY					
Corrections on Landing Distance (m)			**WGT**[2]	**SPD**	**ALT**	**WIND**	**TEMP**	**SLOPE**	**REV**	**OVW**
Braking Mode	**LDG CONF**	**REF DIST (m) for 66T**	**Per 1T above 66T**	**Per 5kt**	**Per 1000ft above SL**	**Per 5kt TW**	**Per 10°C above ISA**	**Per 1% Down Slope**	**Per Thrust Reverser Operative**	**If OVW PROC applied**
Maximum MANUAL	FULL	**1 090**	+ 50	+ 70	+ 40	+ 120	+ 30	+ 20	- 10	+ 780
	3	**1 170**	+ 50	+ 80	+ 40	+ 130	+ 40	+ 20	- 10	+ 940

- If APPR COR is equal to 1/3 Headwind component: **No SPD**
- If APPR COR is greater than 1/3 Headwind component: **SPD = APPR COR**

CAUTION	Any extra pilot approach speed increment must be added to VAPP, and must be taken into account in SPD column for Landing Distance computation.

Note: In case of strong or gusty crosswind greater than 20kt, VAPP should be at least VLS + 5 kt. The 5kt increment above VLS may be increased up to 15kt at the flight crew's discretion.

FACTORED LANDING DISTANCE (**FLD**)

LANDING DISTANCE (LD)

Determine the Landing Distance **(LD)** using the appropriate Landing Distance table.

X

MEL LANDING PENALTY FACTOR

Multiply **LD** by the landing penalty factor specified in the MEL, if any.

X

SAFETY MARGIN

Add a margin, as per airline policy.
Airbus recommends a 15% margin. Under exceptional circumstances, the flight crew may disregard this margin.

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FACTORED LANDING DISTANCE (FLD)

FLD = LD x MEL LANDING PENALTY FACTOR x SAFETY MARGIN

METHOD TO DETERMINE AIRCRAFT PERFORMANCE AT LANDING WITH SEVERAL FAILURES

FLAPS LEVER POSITION FOR LANDING
Select the FLAPS lever position requested by the ECAM*.

* If there are no ECAM instructions, the FLAPS lever position for landing is at the flight crew's discretion.

VAPP
Determine the VAPP using the highest ΔVREF.

VAPP DETERMINATION WITH FAILURE

VAPP = VREF + ΔVREF + APPR COR

VREF												
Weight (T)		40	42	46	50	54	58	62	66	70	74	78
VREF = VLS CONF FULL (kt)	CG < 25%	108	111	116	121	125	130	134	138	142	146	150
	CG ≥ 25%	106	109	114	119	123	128	132	136	140	144	148

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ΔVREF
Refer to the applicable Landing Distance table

6 - DRY											
Corrections on Landing Distance (m)				WGT[2]	SPD	ALT	WIND	TEMP	SLOPE	REV	OVW
FAILURE	FLAPS LEVER for LDG	ΔVREF	REF DIST (m) for 66T	Per 1T above 66T	Per 5kt	Per 1000ft above SL	Per 5kt TW	Per 10°C above ISA	Per 1% Down Slope	Per Thrust Reverser Operative	If OVW PROC applied
WING ANTI ICE SYS FAULT with Ice Accretion	FULL	10	1 260	+ 40	+ 70	+ 50	+ 130	+ 40	+ 20	- 10	+ 600
	3	16	1 370	+ 50	+ 80	+ 50	+ 120	+ 40	+ 30	- 20	+ 770

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APPR oach COR rection

APPRoach **COR**rection	
ΔVREF ⩽ 10 kt	APPR COR = Highest of { • 5kt in case of A/THR ON • 5kt in case of Ice Accretion in CONF FULL 10kt in case of Ice Accretion in CONF 3 • 1/3 Headwind component (excluding gust - maximum 15 kt) *APPR COR + ΔVREF must be limited to 20kt*
10 kt <ΔVREF< 20 kt	APPR COR = 1/3 Headwind component (excluding gust - maximum 10 kt) *APPR COR + ΔVREF must be limited to 20kt*
ΔVREF ⩾ 20 kt	APPR COR = 0kt *N/A displayed in the SPD column of the Landing Distance table*

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VAPP
VAPP = VREF +ΔVREF + APPR COR

RUNWAY LANDING PERFORMANCE LEVEL - CODE
Use the Runway Condition Assessment Matrix to determine the runway landing performance level and code.

RUNWAY CONDITION ASSESSMENT MATRIX FOR LANDING

Runway Surface Conditions		Observations on Deceleration and Directional Control	Related Landing Performance		Maximum Crosswind for Landing (Gust included)
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Damp **Wet** Up to 3 mm (1/8") of water **Slush** Up to 3 mm (1/8") **Dry snow** Up to 3 mm (1/8") **Wet snow** Up to 3 mm (1/8") **Frost**	**Good**	Braking deceleration is normal for the wheel braking effort applied. Directional control is normal.	**5**	**GOOD**	38 kt

DETERMINE THE LANDING DISTANCE **(LDG DIST)** OF THE FAILURE THAT HAS THE MOST EFFECT

1 - Identify the failure with the longest REF DIST

2 - Calculate the landing distance **(LDG DIST)** for this failure taking into account all corrections.

6 - DRY

Corrections on Landing Distance (m)				WGT(2)	SPD	ALT	WIND	TEMP	SLOPE	REV	OVW
FAILURE	FLAPS LEVER for LDG	ΔVREF	REF DIST (m) for 66T	Per 1T above 66T	Per 5kt	Per 1000ft above SL	Per 5kt TW	Per 10°C above ISA	Per 1% Down Slope	Per Thrust Reverser Operative	If OVW PROC applied
WING ANTI ICE SYS FAULT with Ice Accretion	FULL	10	**1 260**	+ 40	+ 70	+ 50	+ 130	+ 40	+ 20	- 10	+ 600
	3	16	**1 370**	+ 50	+ 80	+ 50	+ 120	+ 40	+ 30	- 20	+ 770

(1) Automatic Landing correction: add 140m - (2) Weight correction: subtract 10m per 1T below 66T

REF DIST without failure (valid for all FLAPS LEVER positions) = 1 090m

SPD = APPR COR only if APPR COR > 1/3 H-Wind Component else NO SPD correction. Any extra speed increment must be added to VAPP and taken into account in SPD column. If N/A displayed in SPD column then do not add any extra speed increment.

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DETERMINE THE EFFECT OF THE OTHER FAILURE (ΔLD)

1 - Identify the [REF DIST with failure] of the other failure (no correction)**

2 - Calculate **ΔLD** = [REF DIST with failure] - [REF DIST without failure].

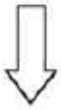
** Use the FLAPS lever position selected for landing. If not available, use FLAPS 3.

6 - DRY

Corrections on Landing Distance (m)				WGT(2)	SPD	ALT	WIND	TEMP	SLOPE	REV	OVW
FAILURE	FLAPS LEVER for LDG	ΔVREF	REF DIST (m) for 66T	Per 1T above 66T	Per 5kt	Per 1000ft above SL	Per 5kt TW	Per 10°C above ISA	Per 1% Down Slope	Per Thrust Reverser Operative	If OVW PROC applied
WING ANTI ICE SYS FAULT with Ice Accretion	FULL	10	**1 260**	+ 40	+ 70	+ 50	+ 130	+ 40	+ 20	- 10	+ 600
	3	16	**1 370**	+ 50	+ 80	+ 50	+ 120	+ 40	+ 30	- 20	+ 770

(1) Automatic Landing correction: add 140m - (2) Weight correction: subtract 10m per 1T below 66T

REF DIST without failure (valid for all FLAPS LEVER positions) = 1 090m



DETERMINE THE LANDING DISTANCE WITH SEVERAL FAILURES **(LD)**
LD = LDG DIST + ΔLD

FACTORED LANDING DISTANCE **(FLD)**
DETERMINE THE LANDING DISTANCE WITH SEVERAL FAILURES **(LD)**
LD = LDG DIST + ΔLD
X
MEL LANDING PENALTY FACTOR
Multiply **LD** by the landing penalty factor specified in the MEL, if any.
X
SAFETY MARGIN
Add a margin, as per airline policy. Airbus recommends a 15% margin. Under exceptional circumstances, the flight crew may disregard this margin.

FACTORED LANDING DISTANCE **(FLD)**
FLD = LD x MEL LANDING PENALTY FACTOR x SAFETY MARGIN