

EU-OPS 1

Aerodrome Operating Minimums on Jeppesen Charts

Mario Ettelt

Airway Manual Standards

Stockholm, 16 Oct 2008



AGENDA

TOPICS

- 01 General
- 02 Take-off
- 03 Circling Approaches
- 04 Non-precision Approaches
- 05 CAT I and APV Approaches
- 06 Lower than Standard CAT I
- 07 CAT II Approaches
- 08 Other than Standard CAT II
- 09 CAT III Approaches
- 10 Aerodrome Minimums Listing
- 11 State published Minimums
- 12 Additional Items



01 General

OPS 1.430(a)(1)

An operator shall establish for each aerodrome planned to be used, aerodrome operating minima that are not lower than the values given in Appendix 1 (old) or Appendix 1 (new) as applicable.

The method of determination of such minima must be acceptable to the Authority.

Such minima shall not be lower than any that may be established for such aerodromes by the State in which the aerodrome is located, except when specifically approved by that State.

01 General

Some Results from our customer survey

- 90% use Jeppesen calculated minimums
- 81% have FMS on board
- 71% have Non-precision approaches in their database
- 49% have VNAV information in their database
- 88% already fly continuous descent on final
- 45% $DA(H) = MDA(H) + \text{add-on}$
- 84% can use DME for distance vs altitude tables
- 75% can use FMS/RNAV for distance vs altitude tables
- 49% can use timing instead of DME or FMS/RNAV
- 71% are familiar with segment minimum altitudes

01 General

Some Results from the customer survey

- 45% intend to use Lower than STD CAT I minimums
- 45% intent to use Other than STD CAT II minimums
- 32% intent to fly GLS procedures in the future
- 59% fly or intent to fly APV approaches
- 19% use HUD/HUDLS
- 48% expect to need the new minimums for all locations at once
- 65% prefer the minimums on approach chart
- 42% fly coupled CAT I approaches
- 62% use flight-director on CAT I approaches

02 Take-off

Table 1

Facilities	RVR/VIS (m) CAT A, B & C (1)(2)	RVR/VIS (m) CAT D (1)(2)	LVP in force	Box A	Box B	Box C
Approved Operators (with approved lateral guidance system)	75	75	x	as note		
Approved Operators	125	150	x	x		
RL, CL & multiple RVR information (3)	150	200	x	x	x	
RL & CL	200	250	x	x	x	
RL and/or RCLM (4)	250	300	x	x	x	x
RL and/or RCLM (4)	400	400	-	x	x	x
Nil (Day only)	500	500	-	x	x	x
Notes: (1) For RVR/VIS below 400m Low Visibility Procedure must be in use. (2) The reported RVR/VIS of the initial part of take-off run can be replaced by pilot assessment. (3) The required RVR value must be achieved for all relevant RVR reporting points except the initial part of take-off run. (4) For night operations at least RL and runway end lights are required.						

02 Take-off

Standard		TAKE-OFF 1				
		All Rwys				
		LVP must be In Force				
2		Approved Operators HIRL, CL & mult. RVR req	RL, CL & mult. RVR req	RL & CL	RCLM (DAY, only) or, RL	RCLM (DAY, only) or, RL NIL (DAY, only)
A						
B		125m	150m	200m	250m	400m 500m
C						
D		150m	200m	250m	300m	
1 Operators, applying U.S. Ops. Specs.: CL required below, 300m; approved guidance system required below, 150m.						
2 With approved guidance system: ABCD, 75m.						

Standard		TAKE-OFF 1		
		All Rwys		
		LVP must be In Force		
		RCLM (DAY, only) or, RL	RCLM (DAY, only) or, RL	NIL (DAY, only)
A				
B		250m	400m	500m
C				
D		300m		
1 Operators, applying U.S. Ops. Specs.: CL required below, 300m.				

Standard		TAKE-OFF 1				
		All Rwys				
		LVP must be In Force				
		RL, CL & mult. RVR req	RL & CL	RCLM (DAY, only) or, RL	RCLM (DAY, only) or, RL	NIL (DAY, only)
A						
B		150m	200m	250m	400m	500m
C						
D		200m	250m	300m		
1 Operators, applying U.S. Ops. Specs.: CL required below, 300m.						

03 Circling Approaches

As per the table but not below MDH and RVR/CMV of the preceding instrument approach procedure

Aircraft Category	A	B	C	D
MDH (ft)	400	500	600	700
VIS (m)	1500	1600	2400	3600

Standard		STRAIGHT-IN, LANDING, RWY 07		CIRCLE-TO-LAND	
		DA(H) 660' (409')		Not authorized South of airport	
		ALS out		Max Kts	MDA(H) VIS
A	RVR 1500m	RVR 1500m		100	690' (416') 1500m
B				135	780' (506') 1600m
C		RVR 1900m		180	880' (606') 2400m
D				205	980' (706') 3600m

Standard Circling Minimums
(preceding instrument approach is CDFA)

Raised Circling Minimums

(preceding instrument approach is non-CDFA or does not fulfill all the design criteria)

Standard		STRAIGHT-IN, LANDING, RWY 07		CIRCLE-TO-LAND	
		MDA(H) 680' (429')		Not authorized South of airport	
		ALS out		Max Kts	MDA(H) VIS
A	RVR 1800m	CMV 2200m		100	710' (436') 2200m
B				135	780' (506') 2200m
C		CMV 2400m		180	880' (606') 2400m
D				205	980' (706') 3600m

04 Non-precision Approaches

OPS 1.430(d)(2) All non-precision approaches shall be flown using the continuous descent final approaches technique...

Minimums:

- CDFA will be the Standard on Jeppesen charts
- non-CDFA only in exceptional cases
- Jeppesen will publish DA(H) instead of MDA(H) for CDFA approaches
- Jeppesen will not use an add-on when publishing a DA(H),
- to use or not use an add-on is still the operators responsibility
- Jeppesen will publish MDA(H) for non-CDFA approaches

04 Non-precision Approaches

CDFA minimums (IALS, fulfilling all criteria)

Standard		STRAIGHT-IN. LANDING. RWY 07		CIRCLE-TO-LAND	
		DA(H) 680' (429')			
		ALS out		Max Kts	MDA(H) VIS
A					
B	RVR 1500m		RVR 1500m		
C					
D	RVR 1600m		RVR 2000m		

CDFA minimums (IALS, not fulfilling all criteria)

Standard		STRAIGHT-IN. LANDING. RWY 07		CIRCLE-TO-LAND	
		DA(H) 680' (429')			
		ALS out		Max Kts	MDA(H) VIS
A					
B					
C	RVR 1600m		RVR 2000m		
D					

CDFA and Non-CDFA if necessary (IALS)

Standard		STRAIGHT-IN. LANDING. RWY 07				CIRCLE-TO-LAND	
		DA(H) 680' (429')		MDA(H) 680' (429')			
		ALS out		ALS out		Max Kts	MDA(H) VIS
A							
B	RVR 1500m	RVR 1500m		RVR 1800m	CMV 2200m		
C							
D	RVR 1600m	RVR 2000m		RVR 2000m	CMV 2400m		

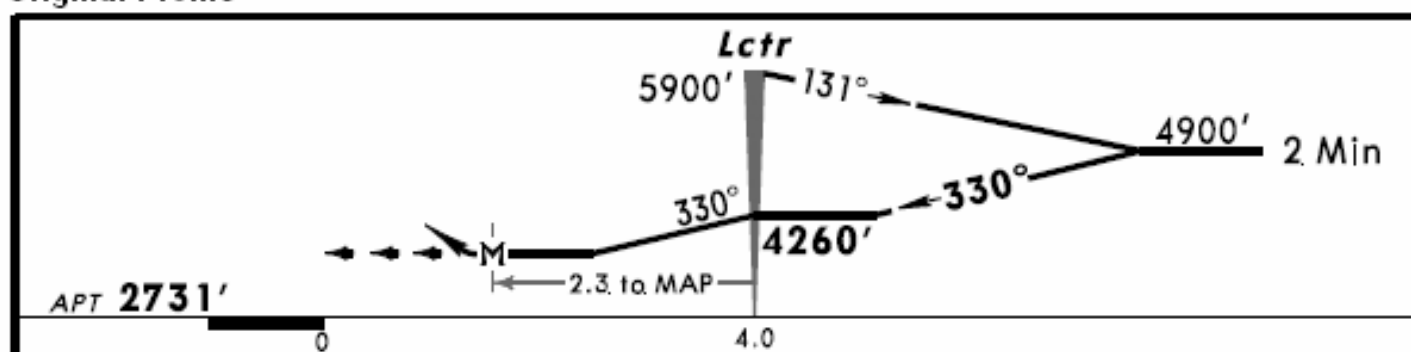
04 Non-precision Approaches

Profile View:

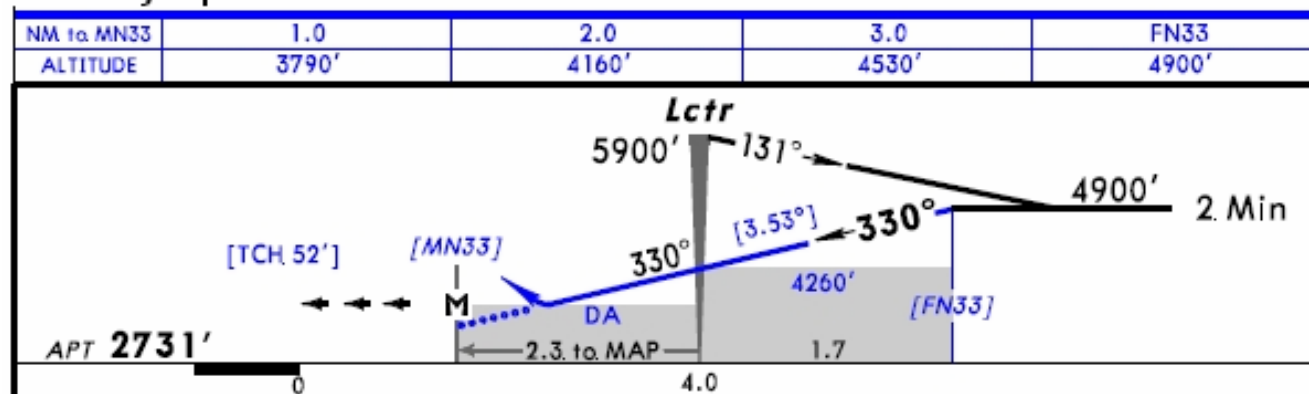
- CDFA will be the Standard depiction on Jeppesen charts
- non-CDFA only in exceptional cases
- all procedures have to be checked to be qualified for CDFA
- inclusion of check altitudes (DME, RNAV/FMS, Timing)
- pull-up arrow at DA(H)
- source published minimum altitudes will be depicted as segment minimum altitude
- no level segment before missed approach point
- MAP at source published position
- if no source published descent gradient/angle is available, then Jeppesen will calculate it (same as coded in the database)
- start of descent may be delayed to after FAF position

04 Non-precision Approaches

Original Profile



CDFA only depiction



04 Non-precision Approaches

Altitude checks

Option 1: Source provided recommended altitudes

Option 2: DMS versus altitude information

Option 3: RNAV/FMS distance versus altitude information

Option 4: Timing versus altitude information

NM to NEXT WP	3.0	2.0	1.0	60THR	5.0	4.0	3.0	RW09
ALTITUDE	2940'	2620'	2300'	1980'	1660'	1340'	1030'	
NM to RW09	9.0	8.0	7.0	6.0	5.0	4.0	3.0	2.0
ALTITUDE	2940'	2620'	2300'	1980'	1660'	1340'	1030'	710'

LG. Lcrr: 5000'					
3.60°	20s	40s	60s	80s	100s
90. kt	4810'	4620'	4430'	4240'	4050'
120. kt	4750'	4490'	4240'	3980'	3730'
140. kt	4710'	4410'	4110'	3820'	3520'
160. kt	4660'	4320'	3980'	3650'	
180. kt	4620'	4240'	3860'		

05 CAT I and APV Approaches

(d)(5) An RVR of less than 750m may be used:

- For CAT I with FALS and TDZ and CL and DH 200ft
- For CAT I to runways without TDZ and/or CL when using an approved HUDLS, when conducting a coupled or flight-director-flown approach
- For APV with FALS and TDZ and CL, when using an approved HUD

From the survey we understood that our customers need both sets of minimums.

05 CAT I and APV Approaches

Standard		STRAIGHT-IN, LANDING RWY 26				CIRCLE-TO-LAND	
		ILS		LOC (GS out)			
		DA(H) AB: 1258' (200') C: 1318' (260') D: 1388' (330')					
		FULL	Limited	ALS out		Max Kts	MDA(H) VIS
A	RVR 550m			RVR 1200m		110	
B	RVR 600m		RVR 750m	RVR 1300m		135	
C	RVR 800m			RVR 1500m		180	
D	RVR 800m		RVR 800m	RVR 1500m		205	

FALS

Standard		STRAIGHT-IN, LANDING RWY 26				CIRCLE-TO-LAND	
		ILS		LOC (GS out)			
		DA(H) AB: 1258' (200') C: 1318' (260') D: 1388' (330')					
		FULL / Limited		ALS out		Max Kts	MDA(H) VIS
A	RVR 750m			RVR 1200m		110	
B	RVR 800m			RVR 1300m		135	
C	RVR 800m			RVR 1500m		180	
D	RVR 1100m			RVR 1500m		205	

IALS

(no values below 750m)

05 CAT I and APV Approaches

Standard		STRAIGHT-IN LANDING RWY 26		CIRCLE-TO-LAND	
		LNAV/VNAV DA(H) 1308 ^r (250')	LNAV	Max Kts	MDA(H) VIS
		ALS out			
A				110	
B				135	
C	RVR 750m I	RVR 1300m		180	
D				205	
I With TDZ, CL and HUD: RVR 600m					

APV with FALS

APV with IALS

(no values below 750m)

Standard		STRAIGHT-IN LANDING RWY 26		CIRCLE-TO-LAND	
		LNAV/VNAV DA(H) 1308 ^r (250')	LNAV	Max Kts	MDA(H) VIS
		ALS out			
A				110	
B				135	
C	RVR 800m	RVR 1300m		180	
D				205	

06 Lower than Standard CAT I

To conduct Lower than Standard CAT I operations:

- The operator shall be approved by the authority.
- auto-coupled to an autoland or an approved HUDLS shall be used ...
- The autoland system shall be approved for CAT IIIA operations.
- In service proving requirements shall be completed (aircraft, aerodrome, runway).
- Training shall be completed (training & qualification applicable to CAT II operations as of Appendix 1 to OPS 1.450).
- LVP

Depends on the Operator – Minimums will not be shown on Jeppesen Standard charts, customer has to request a tailored or limited chart

07 CAT II Approaches

Standard		STRAIGHT-IN, LANDING, RWY 04 CAT II ILS	
ABCD RA 141' DA(H) 855' (100')		LACFT RA 184' DA(H) 877' (122')	
RVR 300m I		RVR 400m	
I Operators, applying U.S. Ops Specs.: Autoland or, HGS, required, below, RVR, 350m.			

08 Other than Standard CAT II

Per Definition:

A CAT II instrument approach and landing operation to a runway where

- some or all of the elements of the ICAO Annex 14 CAT II lighting system are not available,
- with a DH below 200ft but not lower than 100ft and
- an RVR of not less than 350/400m.

Standard		STRAIGHT-IN, LANDING, RWY 04 CAT II ILS	
ABCD RA 141' DA(H) 855' (100')		LACFT RA 184' DA(H) 877' (122')	
ALS out		ALS out	
RVR 450m I	RVR 700m	RVR 450m	RVR 700m
I With CL: CAT. A, B. & C. RVR 350m, CAT. D. RVR 400m			

09 CAT III Approaches

CAT III Minimums depend on the operator's approval.

CAT III Minimums will only be charted on customer tailored charts or as standardized minimums on our Airline Chart Series (CAO).

Depiction depends on customer minimums and requirements (aircraft type or aircraft category specific).

Standard		STRAIGHT-IN, LANDING, RWY 10						CIRCLE-TO-LAND 2			
CAT IIIA		ILS CAT II RA 105'		CAT I			LOC (GS out)		Prohibited South of, rwy, when LF(R) 6A active		
DH 50'		DA(H) 656' (100')		DA(H) 756' (200')			DA(H) 830' (274')		W/o Local ATS 3		
		FULL		Limited	ALS out		ALS out		Max Kts	MDA(H) — VIS	MDA(H) — VIS
C	RVR 200m	RVR 300m 1		RVR 550m	RVR 750m	RVR 1200m	RVR 750m	RVR 1300m	180	1190' (634') 2400m	1530' (974') 2400m
D									205	1290' (734') 3600m	1600' (1044') 3600m
1 Operators, applying, U.S., Ops. Specs.: Autoland or, HGS, required, below, RVR 350m.											
2 Circling height, based on, rwy. 10, displ. thresh. elev. of, 556'. 3 NIGHT: NOT, AUTHORIZED.											

10 Minimums Listing

We plan to convert all affected airports until 16 July 2011, but we are talking about more than 1000 airports and more than 5000 charts in the eastern hemisphere.

The conversion has to be done in addition to the normal revision. Therefore it will start slowly and we will not be able to give you an estimate for an airport.

We will create 10-9S pages as a temporary solution on customer request (similar to current 10-9X JAR-OPS pages).

We can not wait with the conversion until most of our customers move to the new minimums. For those customers we will – on request – create 10-9X charts again. But we need to know the affected airports well in advance.

EDCM/RLI

JEPPesen
21. SEP. 08 **10-9S**

Standard
KAMENZ, EUROPEAN UNION
MAY BE INTL

STRAIGHT-IN RWY		A	B	C	D
29L	ILS ①	5087'(223') R550m R1200m	5087'(223') R550m R1200m	5087'(223') R550m R1200m	5087'(223') R550m R1200m
	ALS out				
	LOC	NOT APPLICABLE			
	VOR DME ②	5510'(646') R1500m	5510'(646') R1500m	5510'(646') C2300m	5510'(646') C2300m
29R	ALS out				
	NDB DME	5510'(646') C2500m	5510'(646') C2500m	5510'(646') C2700m	5510'(646') C2700m
	ALS out	C3200m	C3200m	C3400m	C3400m
	VOR DME ②	5810'(948') R1500m	5810'(948') R1500m	5810'(948') C2400m	5810'(948') C2400m
29R	ALS out				
	NDB DME	5810'(948') C3800m	5810'(948') C3800m	5810'(948') C4000m	5810'(948') C4000m
	ALS out	C4500m	C4500m	C4700m	C4700m

① Missed apch climb gradient: min. 4.0%

② Continuous Descent Final Approach

CIRCLE-TO-LAND	100 KT	135 KT	180 KT	205 KT
Not. authorized	5870'(950')	5770'(950')	6380'(1460')	6380'(1460')
North of airport	1500m ③	1600m ③	2400m ③	3600m ③

③ or higher minimums of preceding straight-in approach

TAKE-OFF RWY 11L/R, 29L/R		
LVP must be in Force		
RCLM (DAY only) or RL	RCLM (DAY only) or RL	NIL (DAY only)
A B C D	250m 400m	500m

11 State published Minimums

If State minimums are officially published the depiction of AOM may differ from the standard depiction where all values are expressed as RVR or CMV.

1. If RVR/CMV and VIS are charted together, the RVR value is compulsory. If no RVR is reported, the VIS has to be used without conversion.
2. No prefix is charted if RVR/CMV and VIS is identical. The reported RVR is compulsory. If no RVR is reported, the VIS has to be used without conversion.
3. If only VIS is charted, the VIS has to be used without conversion.

12 Additional Items

1. Steep Approaches
2. Single Pilot Operations
3. Enhanced Vision systems
4. Planning Minimums

Documentation



JEPPESSEN

BRIEFING BULLETIN

26 SEP 08

JEP 08-D

AERODROME OPERATING MINIMUMS ACCORDING TO EU-OPS 1

General Information

The European Union published the 2nd Amendment of EU-OPS 1 (Annex III to Regulation 3922/91).

<http://eur-lex.europa.eu/JOIndex.do?ihmlang=en>

This EU-OPS 1 is the replacement of JAR-OPS 1 and contains a new method to determine Aerodrome Operating Minimums (AOM). The new method will become the European Standard on 16 July 2011 at the latest.

According to ICAO Doc 9365-AN910 (Manual of All Weather Operations) and Annex 6 to the Convention on International Civil Aviation it is the operator's responsibility to establish Aerodrome Operating Minimums which need to be approved by the responsible authority.

The Appendix 1 (new) to OPS 1.430 describes the method which has to be used by all European Operators and within the European Union (EU).

Jeppesen will support your operations by replacing the current JAR-OPS AOM with the new Standard. Due to the huge number of airports (1000+) and procedures (5000+) the conversion could only be done on a step by step basis.

It is our intent to have all procedures revised to the new Standard AOM by 16 July 2011 for all airports within

- European Union member states,
- European Aviation Safety Agency (EASA) member states,
- Joint Aviation Authorities (JAA) member states and
- for other states where the currently used JAR-OPS AOM will be replaced.

In May 2008 we asked commercial operators about their plans for this EU-OPS implementation. The following items are directly related to the results of that survey: