



WYVERN

Wednesday Webinar

MINIMUM EQUIPMENT LIST


UNLOCK THE MYSTERY....

Part 1

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Tom Atzert Leading Edge ATS

Bio:

- Maintenance & Engineering background
- MEL user, administrator, author, manager, biz owner
- Long-time MMEL Industry Group member
- On-call MEL SME for NBAA (Flt & Tech Ops teams)
- Co-Chair: FAA/Ind. MMEL/MEL Strategy Group

Part 1 Topics

- MEL 101 – the basics
- MMEL vs. Operator MEL
- Regulatory requirements
- MMEL development
- MEL Remarks or Exceptions
- MEL Repair Categories
- (M) Maintenance & (O) Operations procedures
- Application of the MEL

Part 2 Topics – Deeper Dive

- Value of the MEL
- Safety/risk assessment
- No conflict
- Failure scenarios
- 14 CFR Pt 91 D095 LOA vs. D195 LOA
- MEL relief for STC'd systems / equipment
- NEF (Non-essential Equipment / Furnishings)
- CDL (Configuration Deviation List)

Quick History Lesson

Minimum Equipment Concept:

- The concept of “minimum equipment” was recognized as far back as 1930, although no clear-cut regulations addressed flight with inoperative equipment
- Accident in 1935 led to related regulations being introduced in 1938
- Further evolution in mid-1960s (Lockheed Electra MMEL R9, 04/15/67)
- Lorenzo-era abuse of MEL led to ALPA and congressional involvement (mid-1980s)
- Joint FAA/industry MMEL/MEL task force formed early 1990s (FAA, ATA, ALPA, OEMs, Operators)
- Many improvements to enhance safety and dispatch reliability since then...

MEL 101

Basic Concept:

- An aircraft conforms to its type design and remains airworthy throughout its lifespan via routine and non-routine maintenance activities
- MEL allows an otherwise non-airworthy aircraft to be temporarily operated until repairs can be made

MEL 101

Basic Concept:

- The MEL constitutes an approved change to type design without requiring recertification (Pt 121, 125, 135)
- The MEL and the FAA LOA constitute an STC for the aircraft (Pt 91)

MMEL vs. Operator MEL

- The MMEL is the primary source on which the operator MEL is based
- The MMEL covers all OEM TC'd configurations for the Make, Model, Series of covered aircraft
- An operator MEL is tailored to its specific fleet configuration and type of operation (91, 135, etc.)

Regulatory

- 14 CFR 91.213
- 14 CFR 121.628
- 14 CFR 125.201
- 14 CFR 135.179
- OpsSpec D095 (M/Spec D095 for 91K), LOA D095 (Pt 91), LOA D195 (Pt 91)



MMEL Development

Jointly developed by FAA & OEM (with input from operators):

- FAA AED & FOEB (FSIMS 8900.1 V8, Ch2, S3)
- Basic evaluative process:
 - Certification/regulatory considerations
 - No conflict with ADs, AFM limitations, emergency procedures
 - Transfer of function
 - Effect of failure and effect of next critical failure
 - Required (M) and/or (O) procedures

MEL Elements

27-05 Rudder Trim Indicator					
Repair Category			Number Installed		
Item	Name / Description			Number Required for Dispatch	
-01	Rudder Trim Indicator	C	1	0	Remarks or Exceptions (M)(O) May be inoperative provided before each departure: <ul style="list-style-type: none"> a) Rudder Control System is verified operative, and b) Rudder Trim is verified to be in the neutral position.

MEL Elements

(M) MAINTENANCE PROCEDURES

27-05-01

CHECK OF NEUTRAL POSITION OF FLIGHT CONTROLS

From outside the aircraft.

- Use appropriate means to verify the symmetry of either the ailerons or the flaps and neutral position of the rudder.

(O) OPERATIONAL PROCEDURES

27-05-01

CHECK OF RUDDER TRIM

During "PRETAXI CHECK" AFM Normal Procedure (Section 4, Sub-section 10) visually check the Rudder trim operation.

Remarks or Exceptions

- Sets conditions and/or limitations for MEL dispatch
- May include (M) and/or (O) symbol
- For Repair Category “A” items, repair limit is defined (flights, flight legs, cycles, hours, days, etc.)
- May note AFM limitation must be observed (reminder)
- Alternate procedures must be established and used
- Procedures do not require its use

MEL Repair Categories

Repair requirements Pt 91, 91K, 121, 125, 135 (minimizes flight crew exposure to non-standard configuration and ensure timely return of aircraft to its design level of safety and reliability):

- Pt 91:
 - Repair category intervals indicated by the letters B, C, and D in the MMEL are not applicable (while not mandatory, compliance considered best practice)
 - Operators must comply with any provisos, conditions, limitations, or restrictions defining a repair interval (flights, flight legs, cycles, hours, days, etc.) - Category A
- Pt 91K, 121, 125, 135:
 - All users of an MEL approved under these parts must effect repairs of inoperative instrument & equipment items within the times specified for Category A, B, C, and D

(M)s and (O)s

(M) Maintenance & (O) Operations procedures:

- “(M)” symbol present in MMEL/MEL item
 - Actions required to ensure the aircraft is in safe condition for MEL dispatch
- “(O)” symbol present in MMEL/MEL item
 - Actions required to operate aircraft in non-standard configuration

Application of the MEL

Basics of dispatch with inoperative equipment:

- Malfunction occurs...
 - Record malfunction in maintenance logbook
- Troubleshoot to determine nature of fault...
 - Fix or defer (consider parts availability, tooling, time, manpower, etc.)
- If repair not possible...
 - Refer to MEL, observe all conditions/limitations, accomplish (M) and/or (O) procedures

Dispatch Requirements

27-01 Aileron and Elevator Arthur Q Units					
Repair Category			Number Installed		
Item	Name / Description			Number Required for Dispatch	Remarks or Exceptions
-01	Aileron and Elevator Arthur Q Units	B	2	0	(M)(O) May be inoperative provided: <ul style="list-style-type: none"> a) Arthur Q units are in the low speed position, and b) Airspeed remains at or below 260 KIAS/Mach .76, and c) Autopilot is not used (refer to MEL item 22-01-01). RVSM OPERATIONS NOT AUTHORIZED



Thank You

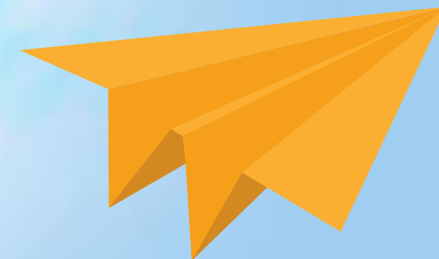
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Part 2 – The Deeper Dive

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March 10, 2021

Value of the MEL

MEL dispatch with inoperative equipment ensures:

- Acceptable level of safety achieved
 - MMEL development and MEL approval process
- Minimize or avoid flight interruptions
 - Improves dispatch reliability / aircraft availability
- Value can be expressed in terms of cost avoidance

Safety / Risk Assessment

Safety/risk assessment and operator obligations associated with MEL dispatch:

- System and equipment failures must be reported by making an entry in the aircraft maintenance records
- The MEL permits operations with inoperative items for the minimum time necessary until repairs can be made
- Repairs should be made at the earliest opportunity to return the aircraft to its design level of safety & reliability
- Establish a controlled and sound repair program
- Exercise the necessary operational control to ensure that an acceptable level of safety is maintained
- When operating with multiple inoperative items, the interrelationship between those items, and the effect on aircraft operation and crew workload, must be considered

No Conflict (ADs, AFM, etc.)

MEL relief and associated (M) & (O) procedures must not conflict with:

- Airworthiness directives
- AFM limitations
- Emergency procedures

However, non-normal procedures are assessed during the MMEL development process (e.g., APU relief)

Failure Scenarios

MEL vs. FCOM/AFM Non-normal procedures:

- Failures that occur before application of takeoff power:
 - MEL applies
- Failures that occur after application of takeoff power:
 - FCOM/AFM Non-normal procedures apply

14 CFR Pt 91 D095 vs D195 LOA

- Pt 91 D095: Use the MMEL as an MEL
 - Required elements: MMEL, Preamble (PL-36), Definitions (PL-25), (M) & (O) procedures, define CFR
 - MMEL was not intended to be used by operators as a dispatch document
 - Does not meet ICAO Annex VI, Part II, which specifies that operators are to develop an MEL “approved by the state of registry”

MMEL as MEL?

Master Minimum Equipment List (MMEL)

Revision: 61

Date: 07/08/2020

Boeing 737

B-737-100/200/300/400/500/600/700/800/900/900ER

Master Minimum Equipment List (MMEL)

Revision: 11

Date: 07/10/2020

Bombardier Challenger

CL-600/601/601-3A/601-3R/604/605/650

MMEL as MEL?

Master Minimum Equipment List

Revision: 8d

Date: 12/12/2013

Hawker Beechcraft HS-125

**DH.125-1A, HS.125-1B, DH.125-1A-522, HS.125-1B-522,
DH.125-1A/R-522, HS/125-1B/R-522, DH.125-1A/S-522,
HS.125-1B/S-522, DH.125-3A, HS.125-3B, DH.125-3A/R,
HS.125-3B/R, DH.125-3A/RA, HS.125-3B/RA,
HS.125-3B/RB, HS.125-3B/RC, HS.125-F3B,
HS.125-F3B/RA, BH.125-400A, DH.125-400A,
HS.125-400A, HS.125-400B, HS.125-400B/1,
HS.125-401B, HS.125-403A(C), HS.125-403B,
HS.125-F400B, HS.125-F403B, BH.125-600A,
HS.125-600A, HS.125-600B, HS.125-600B/1,
HS.125-600B/2, HS.125-600B/3, HS.125-F600B,
HS.125-700A, HS.125-700B, BAe.125-800A,
BAe.125-800B, Hawker 800, Hawker 800XP,
Hawker 850XP, Hawker 900XP, Hawker 750**

MMEL as MEL?

21 ***	STBY RUD ON light (Boeing Service Bulletin 737-27A-1279, 737-27-1252R3, 737-27-1253R3, 737-27-1255R3, or Production Equivalent Incorporated)
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25 ***	Center Tank Fuel Boost Pump Automatic Shutoff System (Service Bulletin 737-28A1228, 737-28A1216, 737-28A1206, or Equivalent Installed)
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22-2	Auxiliary Power Unit (APU) Generator System
1)	Aircraft with IDG P/Ns 720845, 720845A, 720845B
2)	Aircraft with other IDG P/Ns

60-1	Ground Spoiler Manual Arming Switch (600 with SB 600-0452, 601 with SB 601-0113, A/C 3060 and subs, 604, 605, 650)
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60-2	Flight Spoiler Light Flashing Feature (600 with SB 600-0385, 601 with SB 601-0040, A/C 3013 and 3018 to 3990)
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14 CFR Pt 91 D095 vs D195 LOA

- Pt 91 D195 LOA: Tailored operator MEL
 - Actual FAA approved MEL (MMEL is source document)
 - Development and approval process similar to that for Pt 121, 125, 135...
 - Many foreign CAAs do not recognize/allow D095 LOA
 - D095 LOA will eventually be phased out - likely will be a 3-5 year transition period

MEL Relief for STC'd Systems & Equipment

Basic Concept:

- MEL relief for systems/equipment installed via STC is allowed only if relief for that item is found in MMEL or STC relief letter
- STC holders petition FAA for relief
- Relief for STC'd items must be evaluated by FAA FOEB
- FOEB evaluative process same as for TC'd systems/equipment
- Operators with cabin/avionics mods and no available MMEL or STC letter relief need to take action

NEF

Non-essential Equipment & Furnishings items:

- NEF are those items that have no effect on the aircraft's ability to be operated safely under all operational conditions
- Are not be required by the applicable certification or operational rules
- Are not already identified in the MMEL/MEL or CDL of the applicable aircraft
- NEF items are found in passenger compartment, flight deck area, service areas, cargo areas, crew rest areas, lavatories, and galley areas
- Excluded items: component wear limits, fuel/hydraulic leak or engine/APU oil consumption within allowable limits, paint (mismatched, bad, or worn condition), other AMM allowable conditions
- Comprehensive evaluative process determines whether or not item is a candidate for NEF
- For Pt 91, FAA approval not required

CDL

Configuration Deviation List

- FAA approved AFM Appendix or Supplement
- CDL includes secondary airframe and engine external parts that may be missing for dispatch, e.g., service and/or access panels, aerodynamic seals, winglets
- Some missing CDL items degrade aircraft performance and operational penalties must be applied, e.g., weight reductions, speed limits, engine-out driftdown



Thank You

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