MINISTRY OF DEFENCE

Secretariat General of Defence and National Armaments Directorate
Directorate of Air Armaments and Airworthiness

MASTER MINIMUM EQUIPMENT LIST (MMEL) AND MINIMUM EQUIPMENT LIST (MEL)

NOTE

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The issue dates of the original and amended pages are:

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1. PART 1^ INTRODUCTION

1.1 General

In the civilian aviation, the aircrafts release for flight is authorized with temporarily inoperative systems, instruments and equipment as long as they are included in the Minimum Equipment List (MEL). Such list is prepared by the operator on the basis of the Master Minimum Equipment List (MMEL) issued by the type certificate holder. Specific aircraft, regulated by D.A.A.A. regulations and previously developed on civilian standard requirements, are provided with a Master Minimum Equipment List (MMEL) as pertinent documentation issued by the System Design Responsible. On the above concerning, some Armed Forces (AFs)/State Corps (SCs) expressed their intention to use the MEL on aircrafts under D.A.A.A. Authority.

1.2 Aim

The aim of this Technical Publication is to provide information on the origin of the MMEL and MEL. It will illustrate the tasks and the responsibilities for their development, acceptance and military implementation.

1.3 Applicability

This regulation shall be complied with:

- by the Armed Forces/State Corps intending to implement the MMEL and the MEL on aircraft currently regulated according to D.A.A.A. regulations;
- by the Entities/Companies involved in the issuing and in the acceptance process of the MMEL and MEL.

Aircraft that can be provided with the MMEL and consequently, with the MEL, are exclusively the ones:

- that comply with the airworthiness/safety requirements defined according to AER.P-2 of 19/01/2005 or its subsequent editions, in all cases guaranteeing the safety of the overflow population and of the personnel during ground operation;

or

- already provided with the MMEL approved by another Aeronautic Authority.

1.4 Reference Documents

- AER(EP).0-0-2 *Definizione e Regolamentazione del Sistema delle PP. TT. della Direzione Generale degli Armamenti Aeronautici (ARMAEREO)* - Herein translated into: “Rules and definitions for the Technical Publications system of the Directorate of Air Armaments and Airworthiness (D.A.A.A.)”

- AER(EP).P-2 *Omologazione di Tipo Aeromobile Militare, Omologazione, Idoneità alla Installazione* - Herein translated into: “Military Type Certificate and Qualification, System Qualification, Suitability for Installation”

- AER(EP).P-6 *Istruzioni per la compilazione dei Capitolati Tecnici per Aeromobili Militari* – Herein translated into: “Instructions for compiling Capitolati Tecnici for military aircrafts;
- AER.00-1-49 *Libretto Rapporti di Volo e Registro della Manutenzione dell’aeromobile. Mod DP/5069* – Herein translated into: “Aircraft Technical Logs. Mod DP/5069”

All items not specified in this TP shall refer to the AER.(EP).0-0-2.

2. PART 2 MMEL AND MEL MILITARY MANAGEMENT

2.1 MMEL AND MEL

The Minimum Equipment List (MEL) is based on the philosophy that, under certain conditions, an aircraft can be used although some systems, instruments and equipment are temporarily inoperative ensuring the Airworthiness requirements and the safety levels required for the Type Certification and according to the AER(EP).P-2 regulation dated 19/01/2005 or its subsequent editions. This is possible thanks to the redundancy criteria adopted for the design of the systems as well as to the presence of instruments and equipment that are necessary exclusively for particular flight conditions but not for other. Finally, it is possible thanks to the use of specific procedures that allow making up for the functions that are no longer ensured by the faulty instrument or equipment.

The concept of "allowed inefficiency" is linked to two fundamental elements:

- aircraft design features;
- aircraft operational role.

The System Design Responsible (SDR) is responsible for the first point. It shall issue and submit to the D.A.A.A. a basic list for a specific aircraft type, MMEL, including the systems, instruments and equipment that might be temporarily inoperative without affecting its airworthiness/safety. The Entity holding the aircraft (operator) is responsible for the second point. On the basis of the MMEL, it shall issue its MEL, taking into account the specific operational role.

Note

Non-safety/airworthiness related equipment such as galley equipment, passenger convenience items, should not be listed in the MMEL/MEL, and it does not affect the use of the aircraft even if inoperative. Passenger entertainment systems used for "briefings" are not part of the above mentioned equipment. Therefore, if they are not included in the MMEL/MEL and are inoperative, they affect the use of the aircraft.

2.2 MMEL AND MEL ACCEPTANCE

The acceptance process of the MMEL and the MEL is defined in Appendix 1 - Annex III of AER.(EP).0-0-2 regulation.

2.3 MMEL AND MEL DEVELOPMENT

2.3.1. MMEL

The MMEL is issues by the SDR, or by its delegate, taking into account the design features of the specific aircraft type. The introduction of an item (system, instrument, equipment) in the MMEL shall be justified by one or more of the following methods:

- the item may be considered optional;
  there is no necessity for such equipment to be operative if it is in
  excess for safe operations in a particular flight condition. Inclusion in the MMEL of this item can be accepted on this basis. However, for the relevant MEL development, it must be taken into account that an item can be considered optional for one operator and not for another.
- the equipment may be considered redundant;
  when the purpose/function of an item can be carried out by some other efficient items. Redundancy cannot be claimed as justification for inclusion of an item in the MMEL if the two (or more) sources of the function or information are required by the aircraft type certification basis.
- a qualitative safety analysis:
  the qualitative analysis shall consider the impact that the inoperative item has on the pilot workload, on the other items that will be reported in the MMEL, as well as on operational and maintenance procedures.
- a quantitative safety analysis:
  it shall be demonstrated the compliance with the safety levels defined in the certification basis and in any case according to the AER.P-2 of 19/01/2005 or subsequent editions. Such compliance is demonstrated by conducting a System Safety Assessment. However, the additional risk resulting from occasional flights with such equipment inoperative should be established even if the probability of occurrence established during the certification process remain above the required one.
- tests (ground, flight and rig)
  Such tests shall always be representative of the type design.

In addition to the above mentioned justifications, a dedicated analysis shall be always carried out in order to demonstrate the compliance with airworthiness requirements (including safety ones) required for the type certification.

Following such analysis, the maximum time intervals for the elimination of any admitted inefficiency will be defined. About this, the MMEL provides a categorisation of the equipment respect the maximum time interval within which the inefficiency shall be eliminated.

There are four categories for the most cases:

Category A: items in this category shall be repaired within the time interval specified in the column “Notes” of the MMEL. Such period starts upon the detection of the malfunction.

Category B: item in this category shall be repaired within three consecutive calendar days (72 hours), excluding the day of detection.

Category C: item in this category shall be repaired within ten consecutive calendar days (240 hours), excluding the day of detection.

Category D: item in this category shall be repaired within 120 consecutive calendar days (2880 hours), excluding the day of detection.

To issue the MMEL, the SDR shall define the operational and maintenance procedures relevant to the inoperative equipment so as to provide the crew and the maintenance personnel with clear instructions to follow during the malfunction. The MMEL shall indicate the reference to such procedures for each item marked with the symbol "(O)" for operational procedures and with the symbol "(M)" for maintenance ones.

The MMEL format shall comply with the scheme specified in Attachment "A". The single items shall be grouped by systems (e.g. ATA100 classification). The MMEL shall also contain an introduction to define its scope linked with the relevant MEL usage. The introduction shall also include definitions and, if necessary, explanatory notes. In particular, the definitions of categories "A", "B", "C" and "D", as defined above, shall be reported.

2.3.2. MEL

The MEL is developed by the Armed Force/State Corp in conjunction with the Maintenance Organization, if necessary. The MEL is defined for a specific aircraft taking into account its configuration, operational and maintenance conditions. The Armed Force/State Corp shall therefore indicate in the MEL the Military Registration Number to which the MEL itself applies.

To develop the MEL, the content of the MMEL shall be customised in order to take into account the specific aircraft configuration, the national operational regulations and any other operational condition that is not reported in the MMEL. The MEL shall not be more permissive than the MMEL. The MEL format preferred is the same as the MMEL one and in any case it should comply with the scheme specified in Attachment "A". The single items shall be grouped by systems (e.g. ATA100 classification). The MEL shall contain an introduction that specifies the procedures related to its use, definitions and, if necessary, explanatory notes that shall reflect its aim and the principles on the basis of which it has been developed.

Estimates regarding multiple inefficiencies and their effects should be included. Attachment "B" of this regulation specifies the content of a type MEL introduction.

To develop the MEL, the following procedures shall be followed:

a. Operational and maintenance procedures

The Armed Force/State Corp, in conjunction with the Maintenance Organization, if necessary, prepare (on the basis of the corresponding MMEL) the operational and maintenance procedures relevant to the inoperative equipment so as to provide the crew and the maintenance personnel with clear instructions to follow during the malfunction, in compliance with the accepted manuals. The MMEL

shall indicate the reference to such procedures for each item marked with the symbol "(O)" for operational procedures and with the symbol "(M)" for maintenance ones.

The operational procedures are contained in the MEL, in one of its attachments or in another document such as the Flight Manual, the User Manual, the Operation Manual, available on board of the aircraft unless otherwise specified. In such cases, the MEL refers to the appropriate section of the corresponding document. The Maintenance procedures can be specified in a separate document made available at the premises where such procedures are carried out. In any cases, the MEL contains a summary of each procedure so as to inform the crew on necessary maintenance actions. If the System Design Responsible has issued the recommended operational and maintenance procedures related to the inoperative equipment, these can be used directly by the operator or they can be used as a reference for the development of its own procedures.

b. Repair Interval eliminate the inefficiency

The Armed Force/State Corp, in conjunction with the Maintenance Organization if necessary, defines a policy for the management of the repair interval necessary to eliminate the inefficiencies on the basis of the MMEL. Following the safety analysis, the MMEL defines the time interval that is necessary to eliminate (category) each inefficiency. In particular, if the MMEL assigns a category to each equipment establishing a maximum time interval to repair the inefficiency (categorisation), the MEL shall indicate, for each item, a category that cannot be more permissive than the one contained in the MMEL.

The categories are the same as the ones defined in the MMEL, in detail:

Category A: it is used for equipment that can be inoperative reasonably for short periods of time without unacceptable decrease of aircraft safety condition. No standard time interval is usually identified. However, the items in this category shall be repaired within the time interval specified in the “Notes” column in the approved MEL. Such intervals start when the inefficiency is registered in the in the "Aircraft flight/utilization and maintenance logbook - Mod. DP/5069” (AER.00-1-49)

Category B: it is used for equipment that can be inoperative for a specific period of time without determining unacceptable decrease of safety condition or excessive increasing the workload of the crew due to further inefficiency. Items in this category are to be repaired within three (3) consecutive calendar days (72 hours), excluding the day the malfunction was recorded in the "Aircraft flight/utilization and maintenance logbook - Mod. DP/5069” (AER.00-1-49).

Category C: it is used for equipment that can be inoperative for a specific periods of time without reducing the aircraft at an unacceptable levels of safety or increasing excessively the workload of the crew due to further inefficiency. Items in this category shall be repaired within

ten consecutive calendar days (240 hours) excluding the day the malfunction was recorded in the "Aircraft flight/utilization and maintenance logbook - Mod. DP/5069" (AER.00-1-49).

Category D: it is used for equipment that can be inoperative for an extended period of time without affecting safety conditions or increasing the crew workload. Items in this category shall be repaired within 120 consecutive calendar days (2880 hours), excluding the day the malfunction was recorded in the "Aircraft flight/utilization and maintenance logbook - Mod. DP/5069" (AER.00-1-49).

c. Optional/additional equipment

When the aircraft is provided with optional equipment that may be inoperative for the aircraft dispatch, this shall be included in the MEL. In case not all the aircraft of the Armed Force/State Corp fleet are equipped with such equipment, these shall be accompanied by the note "if installed". When the MMEL shows a variable number of installed equipment, the MEL reflects the number of the equipment really installed on the aircraft.

d. Systems alternative means/inoperative instruments

For each element that might be inoperative at the start of the flight, in the Notes shall provide alternative means or procedures that assuring the applicable safety levels.

2.4 MMEL REVISION

The revisions to MMELs shall be carried out in compliance with the AER(EP)0-0-2.

2.5 MEL REVISION

Within 60 days following receipt of the MMEL revision, which makes it more restrictive than the related MEL, the Armed Force/State Corp shall submit to the D.A.A.A. for approval a revision of the MEL incorporating the contents, in compliance with the updating procedures of the Technical Publications established in AER(EP).0-0-2.

2.6 MMEL USE

The MMEL shall be used exclusively in order to develop the MEL.

2.7 MEL USE

Unless otherwise specified by D.A.A.A., the MEL and the relevant operational procedures shall be available on board the aircraft for both the crew and the technical operator. The content of this regulation also refers to inefficiencies due to scheduled maintenance. The MEL can be used for the release to service of an aircraft equipped with inoperative systems, instruments and equipment and, therefore, it does not regulate the inefficiencies that might arise during the flight. To this end, the MEL does not include those inefficiencies that take place or that are detected when the aircraft starts moving itself in order to perform the flight until the

moment when it stops moving after flying. This does not prejudice the possibility for the crew to ask for the restoration of instruments or equipment resulting inoperative after the aircraft release as long as such instruments and equipment are essential for the safety of the flight, taking into account the current operational conditions as well as the forecasted conditions. Besides, the MEL does not prejudice the possibility for the Technical Officer and the pilot to grant the “exceptional release to service”.

2.7.1 INEFFICIENCIES MANAGEMENT

An inefficiency of the systems, instruments and equipment included in the MEL, when registered in the " Aircraft flight/utilization and maintenance logbook - Mod. DP/5069”, implies the removal of the aircraft from service. The aircraft remains out of service until the inefficiency has been eliminated according to the applicable maintenance procedures and instructions or deferred in accordance with the provisions of the MEL and its procedure. The restoration of the efficiency shall be registered in the “Aircraft flight/utilization and maintenance logbook - Mod. DP/5069” in compliance with norm AER.00-1-49. All the efficiencies whose elimination has been deferred, shall be registered in Part III of the “Aircraft flight/utilization and maintenance logbook - Mod. DP/5069”. The period of deferment cannot exceed the interval specified in the corresponding Category defined in the previous paragraphs.

3. PART 3 CONCLUSION

With regard to the above, for military aircrafts the use of the MMEL is allowed exclusively if the document is accepted by the D.A.A.A.. Such use shall be intended only to develop the MEL. The MMEL, in fact, is the basic reference for the developing of the MEL and cannot be used to replace it. The MEL, like the Master MEL, can be used for the military aircrafts only if they have been accepted by the D.A.A.A..

4. PART 4 VALIDITY

Such regulation shall enter into force on the date of its approval. In particular, the MMEL and the MEL provided before such date that have not been approved yet by the D.A.A.A. shall comply with the procedures established in this edition.

MMEL- MASTER MINIMUM EQUIPMENT LIST

(Standard publishing format)

(ARMED FORCE/STATE CORP)	**MINIMUM EQUIPMENT LIST**	
AIRCRAFT Type/Model: Military Registration Number:	Revision n. _____ Date _____	Page _____ of _____

(1) Systems/Equipment	(2) Cat.	(3) Quantity installed	(4) Number required for release	(5) remarks or exceptions

MINIMUM EQUIPMENT LIST - MEL TYPE INTRODUCTION

(Aircraft Type)

1. Preamble.

This document (hereinafter referred to as MEL), when approved by D.A.A.A., allows the release to service of the aircraft in order to perform flights with some temporarily inoperative systems, instruments and equipment as long as safety levels remain acceptable. This is possible thanks to suitable operational and maintenance procedures as well as

- to the transfer of the missing functions to another operational component, or
- by referring to other instruments or equipment that can provide the information requested.

This MEL does not intend to discipline the inefficiencies that might occur during the flight. To this end, the MEL does not include those inefficiencies that take place or that are detected when the aircraft starts moving itself in order to perform the flight until the moment when it stops moving after flying.

Note 1: Training and transit (without passengers on board) flights can be performed if necessary, complying with the content of the Flight Manual, with a lower number of efficient instruments than the one required by this document on condition that the equipment necessary for the respect of airworthiness, or the instruments that will be used during the flight, are efficient. In these cases, an "exceptional release to service" shall be granted, in compliance with the provisions of AER.00-1-49 and its supplements related to the "Aircraft flight/utilization and maintenance logbook - Mod. DP/5069". The Pilot or the Technical Officer decision to grant an "exceptional release to service" prevails over the conditions allowed by the MEL.

The MEL includes only the equipment that are relevant to the airworthiness, or that are required by the employment conditions, that may be inoperative before the release to service of the aircraft as long as the appropriate procedure and limitations are respected. Parts such as the wings, the rudder, the flaps, the engine, the landing gear etc., which are essential for airworthiness, are not included and shall be operative for all flights. All equipment which are related to the airworthiness of the aircraft, that are not included in this list shall be operative. Equipment that is not required for the safe use of the aircraft is not listed.

2. Definitions.

For the purpose of this document, the following definitions are applied:
(List and specify the meaning of the terms and of the symbols used in the document)

3. Purposes and criteria for aircraft release to service.

The aircraft Pilot in command decision to restore the efficiency of inoperative equipment before the flight prevails over the conditions specified in the MEL. The Pilot in command can request that requirements higher than the minimum ones listed are fulfilled when, in his opinion, the efficiency of a specific equipment is essential for the safety of flight under the specific conditions. The MEL has taken into account all multiple inefficiencies. However, it appears unrealistic to expect that all possible combinations have been taken into account. Therefore, in case of multiple inefficiencies, the interrelations among such inefficiencies shall be considered as well as their effects on the

flight and on the crew workload. Before an aircraft with several non-functioning instruments is released in compliance with the MEL, it should be checked that the interface or the interrelation with such equipment does not reduce the required level of safety and/or increase the crew workload. In the case of multiple inefficiencies and, especially, of inefficiencies of the related systems, the circumstances including weather and route conditions, shall be wisely judged. For each item of the MEL, the Operational Procedures are described. These are marked within the text by the symbol "(O)" and shall be followed by the crew if the equipment is inoperative.

4. Maintenance Action.

All efforts shall be made in order to correct all technical inefficiencies as soon as possible so that the aircraft is fully efficient when leaving the maintenance base. The Pilot in command shall be promptly informed in case it should not be possible to restore the efficiency of the equipment before the departure. When an aircraft is released with inoperative equipment, the “Aircraft flight/utilization and maintenance logbook - Mod. DP/5069” (AER.00-1-49 and its supplements) shall contain the detailed description of the inefficiency, the warnings addressed to the air crew and the information concerning the adopted corrective measures. If accessible to the crew, the non-functioning equipment controls and indicators shall be adequately marked. If the undesiderated activation of the inoperative equipment may lead to dangerous situations, the relevant use shall be inhibited as indicated in the related Maintenance Procedures. The Maintenance Procedures, marked with "(M)" for each item of the MEL, contain the maintenance activities to be performed before the release to service of the aircraft with the corresponding inoperative equipment. These are contained in**.....**(identify the Manual, Chapter concerned).

5. Repair intervals.

Inoperative components or equipment shall be repaired (repair is postponed in compliance with the MEL) within the time interval specified in the column "CAT" of the MEL, according to the following categorisation:

Category A: equipment in this category shall be repaired within the time interval specified in the column 5 "Notes" of the MEL.

Category B: equipment in this category shall be repaired within three consecutive calendar days (72 hours) excluding the day the malfunction was recorded in the "Aircraft flight/utilization and maintenance logbook - Mod. DP/5069” (AER.00-1-49 and its supplements).

Category C: equipment in this category shall be repaired within ten consecutive calendar days (240 hours), excluding the day the malfunction was recorded in the "Aircraft flight/utilization and maintenance logbook - Mod. DP/5069” (AER.00-1-49 and its supplements).

Category D: equipment in this category shall be repaired within one hundred and twenty consecutive calendar days (2880 hours) excluding the day the malfunction was recorded in the “Aircraft flight/utilization and maintenance logbook - Mod. DP/5069” (AER.00-1-49 and its supplements).