



CIVIL AVIATION AUTHORITY OF BOTSWANA

GENERAL

ADVISORY

CIRCULAR

CAAB Document GAC-003

DEVELOPMENT OF ACCEPTABLE MINIMUM EQUIPMENT LISTS

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SECTION 1 POLICY & GENERAL INFORMATION

1.1 PURPOSE

This General Advisory Circular (GAC 003) provides guidance for the development of a minimum equipment list for an aircraft or fleet of aircraft for submission to CAAB for approval.

A MEL is approved for a specific make and model of aircraft, and the use of it is authorized by the operator's operations specifications.

1.2 STATUS OF THIS ADVISORY CIRCULAR

This General Advisory Circular is an original issuance.

1.3 BACKGROUND

- A. ICAO Standards and BCARs permit the approval of a MEL if the CAAB finds that compliance with all the aircraft equipment requirements is not necessary in the interest of safety for a particular operation.
- B. If deviations from the requirements of the State of Design in the certification of aircraft were not permitted an aircraft could not be flown unless all systems and equipment were operable. Experience has proved that some unserviceability can be accepted in the short term when the remaining operative systems and equipment provide for continued safe operations.
- C. International standards provide for the approval of a minimum equipment list for those systems and items of equipment that may be inoperative for certain flight conditions with the intent that no flight can be conducted with inoperative systems and equipment other than those specified in the MEL.
- D. A minimum equipment list, approved by the CAAB, is therefore necessary for each aircraft, based on the current Master Minimum Equipment List established for the aircraft type by the organization responsible for the type design in conjunction with the State of Design.
- E. The CAAB requires the operator to prepare a Minimum Equipment List designed to allow the operation of an aircraft with certain systems or equipment inoperative provided an acceptable level of safety is maintained.
- F. The minimum equipment list is not intended to provide for operation of the aircraft for an indefinite period within operative systems or equipment. The basic purpose of the minimum equipment list is to permit the safe operation of an aircraft with inoperative systems or equipment within the framework of a controlled and sound programme of repairs and parts replacement.

Without an approved MEL, inoperative equipment would ground the airplane until repair or replacement of the non-functioning equipment.

Advisory Circulars (ACs) are intended to provide advice and guidance to illustrate a means, but not necessarily the only means, of complying with the regulations, or to explain certain regulatory requirements by providing informative, interpretative and explanatory material.

Where a regulation contains the words "prescribed by the Authority," the AC may be considered to prescribe a viable method of compliance, but status of that "prescription" is always "guidance" (never regulation)

- G.** Operators are to ensure that no flight is commenced with multiple minimum equipment list items inoperative without determining that any interrelationship between inoperative systems or components will not result in an acceptable degradation in the level of safety and/or undue increase in the flight crew workload.
- H.** The exposure to additional failures during continued operation with inoperative systems or equipment must also be considered in determining that an acceptable level of safety is being maintained. The minimum equipment list may not deviate from requirements of the flight manual limitations section, emergency procedures or other airworthiness requirements of the State of Registry or State of the Operator unless the appropriate airworthiness authority or the flight manual provides otherwise. The aviation industry, in consent with the civil aviation authorities, have found that for particular situations, an acceptable level of safety can be maintained with specific items of equipment inoperative for a limited period of time, until repairs can be made.

1.4 APPLICABILITY

The requirement for using an approved MEL is applicable to operators of Botswana registered aircraft in general aviation, aerial work and commercial air transport.

Operators without an approved MEL must operate their aircraft with no known airworthiness or equipment defects.

1.5 RELATED REGULATIONS

The following Botswana regulations are applicable to the use of an approved MEL to operate an aircraft.

- Civil Aviation (Equipment & Instruments) Regulations
- Civil Aviation (Operations of Aircraft) Regulations
- Civil Aviation (AOC Certification & Administration) Regulations

1.6 RELATED PUBLICATIONS

These ICAO publications are source documents for this advisory circular-

- 1) International Civil Aviation Organization (ICAO)
 - Annex 6, Part I, II and III

Copies may be obtained from Document Sales Unit, ICAO, 999 University Street, Montreal, Quebec, Canada H3C 5H7

1.7 DEFINITIONS & ACRONYMS

A. The following definitions are used in this advisory circular-

- 1) **Airplane Flight Manual (AFM)** and **Rotorcraft Flight Manual (RFM)**. The approved flight manual is the document approved by the responsible aircraft certification office (ACO) during type certification.
 - The approved flight manual for the specific aircraft is listed on the applicable type certificate data sheet.

- The approved flight manual is the source document for operational limitations and performance parameters for an aircraft.
 - The term, approved flight manual, can apply to either an AFM or an ARM. The CAAB requires an approved flight manual for aircraft type certification.
- 2) **Aircraft Maintenance Manual (AMM).** The AMM is the source document for aircraft maintenance procedures.
 - The term AMM can apply to either an airplane or a rotorcraft manual. The CAAB requires an AMM for aircraft certification.
 - 3) **Air Transport Association of America (ATA) Specification 100.** ATA Specification 100, Manufacturer's Technical Data, is an international industry numbering standard developed to identify systems and components on different aircraft in the same format and manner.
 - 4) **Configuration Deviation List (CDL).** Aircraft may be approved for operations with missing secondary airframe and engine parts. The aircraft source document for such operations is the CDL.
 - 5) **Flight Operations Evaluation Board (FOEB).** An FOEB is a State of Manufacturer board of personnel assigned for each type of aircraft. The FOEB develops an MMEL for a particular aircraft type.
 - 6) **Flight Operations policy Board (FOPB).** The FOPB develops FOEB and flight standardization board (FSB) policy recommendations, which are approved by the State of Manufacture.
 - 7) **Inoperative.** Inoperative means that a system or component has malfunctioned to the extent that it does not accomplish its intended purpose and/or is not consistently functioning normally within its approved operating limits or tolerances.
 - 8) **Master Minimum Equipment List (MMEL).** A list established for a particular aircraft type by the organization responsible for the type design with the approval of the State of Design containing items, one or more of which is permitted to be unserviceable at the commencement of a flight. The MMEL may be associated with special operating conditions, limitations or procedures.
 - 9) **Minimum equipment list (MEL).** A list which provides for the operation of aircraft, subject to specified conditions, with particular equipment inoperative, prepared by an operator in conformity with, or more restrictive than, the MMEL established for the aircraft type.

B. The following abbreviations and acronyms are used in this advisory circular –

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| 1) AC | Advisory Circular |
| 2) AD | Airworthiness Directive |
| 3) AFM | Aircraft Flight Manual |
| 4) AMM | Aircraft Maintenance Manual |
| 5) BCARs | Botswana Civil Aviation Regulations |
| 6) CAAB | Civil Aviation Authority of Botswana |
| 7) CDL | Configuration Deviation List |
| 8) FOEB | Flight Operations Evaluation Board |

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| 9) FOPM | Flight Operations Policy Board |
| 10) ICAO | International Civil Aviation Organization |
| 11) MEL | Minimum Equipment List |
| 12) MMEL | Master Minimum Equipment List |
| 13) OpSpecs | Operations Specifications |
| 14) POI | Principal Operations Inspector |
| 15) PMI | Principal Maintenance Inspector |

SECTION 2 GENERAL POLICY

2.1 PURPOSE OF THE MEL

- A. There are three categories of items that may be contained in the operator's MEL –
- MMEL items
 - Passenger convenience items
 - Administrative control items
- B. **MMEL Items.** The MEL will list all of the items for which the operator seeks relief and that are appropriate for its operation. The operator, by not listing at its discretion certain items in its MEL, may be more restrictive than permitted by the MMEL.
- C. **Passenger Convenience Items.** The passenger convenience items, as contained in the operator's approved MEL, are those items related to passenger convenience, comfort, or entertainment, such as, but not limited to, galley equipment, movie equipment, in-flight phones, ashtrays, stereo equipment and overhead reading lamps.
- It is incumbent upon the operator and the CAAB to develop procedures to ensure that those inoperative passenger convenience items are not used.
 - Passenger convenience items do not have fixed repair intervals.
 - Items addressed elsewhere in the MMEL shall not be authorized relief as a passenger convenience item.
 - "M" and "O" procedures may be required and should be developed by the operator, approved by the CAAB, and included in the air carrier appropriate document.
- D. **Administrative Control Items.** An operator may use MEL as a comprehensive document to control items for administrative purposes.
- In such cases, the operator's MEL may include items not listed in the MMEL however, relief may not be granted for these items unless conditions and limitations are contained in approved documents other than the MMEL or meet regulatory requirements of the BCARs.
 - Examples of items considered to be administrative control items would be cockpit procedures, medical kits, delaminated windshields and life vests.

2.2 TIMELY REPAIR OF ITEMS THAT ARE INOPERATIVE

- A. The MEL is intended to permit the operation of an aircraft with certain inoperative items for a limited period of time until repairs can be accomplished. The operator is responsible for establishing a controlled and effective repair programme.

- 1) **Repair interval.** Operators must make repairs within the time period specified by the MEL.
 - Although the MEL might permit multiple days of operation with certain inoperative equipment, operators must repair the affected item as soon as possible.

- 2) **Day of Discovery.** The day of discovery is the calendar day an equipment malfunction was recorded in the aircraft maintenance log or record.
 - This day is excluded from the calendar days or flight days specified in the MMEL for the repair of an inoperative item of equipment.
 - This provision is applicable to all MMEL items, such as categories “A”, “B”, “C” and “D”.
 - The operator and the CAAB must establish a reference time in which the calendar day or flight day begins and ends 24hrs later.
 - This reference time is established to ensure compliance with timely repair equipment and items.

- 3) **MMEL Definitions.** More than one set of MMEL definitions exist due to years evolving changes during which not all MMELs have been updated to the latest version of the definitions.
 - However, only one set of definitions may be used with a specific MMEL
 - Only certain portions of the latest definitions may be appropriate for a specific operator’s MEL.
 - Definitions found in global changes, such as administrative control and repair intervals, may be adopted by the operator.

- 4) **Continuing Authorizations.** Approval of a MEL authorizes an operator to use a continuing authorization to approve extensions to the maximum repair interval for category “B” and “C” items, provided the CAAB is notified within 24hours of the operator’s exercise of extension authority.
 - B. The certificate holder is not authorized to extend the maximum repair time for category “A” and “D” items, as specified in the approved MEL.
 - C. Misuse of the continuing authorization may result in an amendment of the operator’s approval to use the MEL.

2.3 GENERAL MEL POLICY

2.3.1 Record Keeping

When an item of equipment becomes inoperative, the operator must report it by making an entry in the aircraft maintenance record, as prescribed by BCARs.

2.3.2 Multiple Items that Are Inoperative

Individual MEL requirements are designed to provide coverage for single failures enroute. When operating with multiple inoperative items, the operator should consider the inter-relationships between those items and the effect on the aircraft operation and crew load, including consideration of a single additional failure occurring enroute.

2.3.3 Fleet Approval

An operator who has a single MEL for multiple aircraft may reflect equipment in its MEL that is not installed on all aircraft in its fleet. In this case, the item's title in the operator's MEL need not reference any specific airplane identification (usually registration number) unless the operator determines that there is need to do so.

2.3.4 Access to MEL

BCARs requires that a MEL be carried onboard the aircraft or that the flight crew have direct access to the MEL information prior to flight. Other means of direct access require approval.

2.3.5 Conflict with other CAAB Approved Documents

The MEL may not conflict with other CAAB approved documents such as the approved AFM limitations and Airworthiness Directives (AD). The operator's MEL may be more restrictive than the MMEL, but under no circumstances may the operator's MEL be less restrictive.

3.0 MEL APPROVAL PROCESS

3.1 General

- A. The operator's MEL is developed by the operator from the appropriate current Master Minimum Equipment List MMEL, then approved the CAAB.
- B. The CAAB approval process for a MEL follows the general process for AOC certification. This section contains an expansion of the CAAB approval process for the MEL.

3.2 MEL Acceptability

The general criteria for MEL acceptability are as follows –

- 1) **Equally or More Restrictive.** The operator's MEL must not be less restrictive than the MMEL, the BCARs, Operations Specifications (OpSpecs), the approved flight manual limitations, certification maintenance procedures or Airworthiness Directives (ADs).
- 2) **Appropriate.** The MEL must be appropriate to the individual aircraft make and model.
- 3) **Specific.** The operator's operations ("O") and maintenance ("M") procedures must be specific to the aircraft and the operations conducted.
- 4) **Applicability.** A MEL should be applicable for the BCAR Operations requirements.

3.3 INITIAL PHASE OF MEL APPROVAL

- A. In this phase of the MEL approval process, the operator should consult with the CAAB regarding requirements for either developing a MEL or revising an existing MEL.
- B. CAAB will require the participation of the different technical specialities during the entire approval process.
- C. During the review of the “O” and “M” procedures, the CAAB may consult with the State of Manufacture or the manufacturer as necessary concerning the specific procedures.

3.3.1 Pre-Application

- A. In phase one of the MEL approval process, the CAAB will determine the scope of the task, based on the operator’s experience with MELs.
- B. The CAAB will adapt the discussion to fit the operator’s needs and experience, and should provide guidance to the operator as necessary.
- C. The CAAB should ensure that the operator clearly understands that MEL document preparation is solely the operator’s responsibility.

The CAAB will advise the operator that, for a MEL to be approved, the following documents must be submitted –

- The proposed MEL or MEL changes
- Necessary “O” and “M” procedures, which may be based on the aircraft manufacture’s Supplemental Type Certificate (STC) modifier’s procedures, or equivalent operator procedures
- A description of the MEL Management/ Administration Programme and its procedures, unless a MEL Management/Administration Programme is already in place
- Any required guidance material developed by the operator, such as training material, guidance and deferral procedures for both maintenance and operations personnel.

- Several manufacturers have produced manuals of recommended procedures for operating with inoperative equipment.
-These documents are typically given names like Configuration Deviation List (CDL)
-Small aircraft manufacturer’s normally do not publish procedures manuals.

3.3.2 Initial Application Review

- A. This phase begins when the operator formally submits the proposed MEL or MEL changes to the CAAB. The CAAB will initially review the operator’s submittal to verify that it is complete, contains the required elements and is detailed enough to permit a thorough evaluation of the MEL

- 1) Unacceptable submittal. If the CAAB finds the proposed MEL package to be

If a mutually acceptable correction cannot be immediately agreed upon, the entire package must be immediately returned to the operator, or its representative, along with an explanation of the problems found within the documents.

incomplete or unacceptable at this time

or at any other juncture in the approval process, the CAAB will contact the operator.

- 2) Acceptable Submittal. If the CAAB finds the proposed MEL package to be complete and to contain the required information in an acceptable format, the detailed analysis begins.

3.3.3 Document Conformance

- A. During this analysis, the CAAB should co-ordinate with the Principal Maintenance Inspector (PMI) and the Principal Operations Inspector (POI) to perform a detailed examination of the proposed MEL document and other supporting documents and procedures.
- B. If the operator does not currently have a MEL programme, its MEL Management Programme must also be reviewed for acceptability.
- C. The CAAB will examine the technical content and quality of the proposed MEL document and other supporting documents and procedures as follows-
 - 1) Timely Review. The CAAB should promptly assess the MEL and notify the operator of any discrepancies or outstanding issues.
 - 2) Reference Material. Inspectors should use the MMEL as the primary reference document when reviewing and approving the MEL. In addition, inspectors should use the following references-
 - Related BCARs
 - Appropriate Advisory Circular (AC)
 - Approved Flight Manual
 - Operator's OpSpecs
 - Operator's manuals
 - MMEL policy letters
 - 3) Co-ordination with Technical Groups. During this phase, the CAAB may elect to co-ordinate with the State of Design for guidance
 - 4) Document Deficiencies
 - 5) Change in Schedule. If certain MMEL items must be addressed within a specific time frame, the CAAB should notify the operator of this requirement as soon as possible. If the operator is unable to meet these schedule requirements, negotiate a new schedule with the CAAB.
- D. When a manufacturer's recommended procedures exist, operators may use them or develop alternate procedures.
- E. When contract services are used to develop the operator's MEL along with acceptable "O" and "M" procedures, the Principal Inspectors should review the "O" and "M" procedures in light of the type of operations being conducted and should ensure acceptability of the procedures.

The CAAB may elect to informally co-ordinate by telephone to clarify minor discrepancies or misunderstandings.

- F. The operator should ensure that the developed MEL procedures can be adequately implemented.
- G. Materials Provided to the CAAB. It is the operator's responsibility to obtain and provide to the CAAB a hard copy of the MMEL document and appropriate guidance material (as a last resort)
- H. Document Form. The operator may submit MEL draft documents to the CAAB either on hard copy (printed on paper) or on computer disc, as mutually agreed upon between the operator and the CAAB. The operator and the CAAB should discuss the techniques that will be used for revising and editing the proposed document. It is important that the operator understand that when the process is complete, the final proposed MEL must be submitted as hard copy.
- I. MEL Format. The MMEL format has been standardized to facilitate the development, revision and approval of both master and operator documents. While the master document contains eight (8) total sections, six (6) of these sections are considered basic for MEL development and should be included in each operator's MEL.
- J. Generic Single Engine MMELs. A generic MMEL for single engine aircraft was developed and published by the United States FAA. This MMEL is applicable to all single engine airplanes and helicopters for which a specific MMEL has not been issued. When an operator is approved to use a generic MMEL, and a specific MMEL for the individual aircraft type is subsequently issued, the operator's MEL must be revised within the specified time frame to conform to the specific MMEL.

3.3.4 Demonstration Phase

- A. A demonstration phase is normally not required before the CAAB issues a MEL approval.
- B. When an operator is developing a MEL in conjunction with original certification for initial issuance of an operating certificate, or when instituting service with a new certificate type, a demonstration of the operator's ability to use a MEL may be conducted during any required demonstration or validation flights.

3.3.5 CAAB Approval of the Operator's MEL

- A. After the CAAB is satisfied that the MEL is in full compliance with all applicable requirements, the CAAB representative shall sign the MEL control page (List of Effective Pages) to signify approval.
- B. For commercial air transport, the operator will be issued OpSpecs that refer to the specific approved documents.

The CAAB may send a letter of approval if desired.

SECTION 4 SPECIFIC CONSIDERATIONS FOR MEL DEVELOPMENT

4.1 MEL MANAGEMENT PROGRAMME

A. Operators must develop a MEL Management Programme as a comprehensive means of controlling the repair of items listed in the approved MEL

A description of this programme must be contained in the operator's maintenance manual or other documents.

B. The MEL Management Programme must include the following –

- A method for tracking the date and time deferral and repair
- The procedures for controlling extensions to maximum repair categories
- A plan for coordinating parts, maintenance, personnel and aircraft at a specific time and place for repair
- A review of items deferred due to in availability of parts
- The specific duties and responsibilities of the managers of the MEL Management Programme, listed by job titles.

4.2 GENEARL REQUIRED ITEMS

A. The operator should compare the operator's MEL changes against the corresponding items in the current MMEL for the specific aircraft type. In addition, inspectors should verify that the operator's MEL contains the following required items-

- 1) **Cover page (optional).** The MEL cover page contains the operator's name and the make and model of the aircraft to which the MEL applies.
- 2) **Table of contents (required).** The table of contents contains a list of all the pages in the MEL by title and the corresponding page identification (usually a page number).
- 3) **Log of Revisions (Required).** The log contains the revision identification (usually a number) and date of the revision. It may also contain a list of the revised pages, a block for the initials of the person posting the change and additional enhancements for use by the operator.
- 4) **Preamble and Definitions (Required).** The standard MMEL preamble and definitions section must be reproduced word for word in each MEL, without modification.
- 5) **Control Page (Required).** The control page is used as a method for keeping track of the status of the MEL and includes a record of the revision status or the date of each page of the operator's MEL. It may also be used as a means of conveying CAAB approval of the MEL.

4.3 MINIMUM CONTENTS

At a minimum, the contents must contain the following –

- The operator's name
- A listing of all the pages in the MEL (including the date of each page and its page number or revision number)
- The MMEL revision number on which the MEL is based
- A signature block containing space for signature of the CAAB (only if this page is used as a means of conveying CAAB approval of the MEL).
- Optional Contents. The operator may include additional information on the control page to provide flexibility and additional approval functions.
- High Lights of Change Page (Optional). This page contains a synopsis of the changes made by the operator in each revision
- Additional Items. The operator may include additional information sections in excess of the six CAAB required sections.

4.4 INDIVIDUAL ATA SYSTEM PAGE EVALUATION

A. These pages contain a list of individual items of equipment in the aircraft together with provisions for the operation of the aircraft when the items are inoperative.

The reviewing inspector should examine the individual ATA system pages, ensuring that the MEL is at least as restrictive as the MMEL and that the operator's procedures are adequate and appropriate.

B. The Inspector should also examine the material contained on these pages for conflict with the BCARs, with the approved flight manual emergency procedures and limitations, and with the operator's OpSpecs. The following elements are included:

4.4.1 STANDARD ATA NUMBERING SYSTEM

Operators should use the standard ATA numbering system, similar to the manner used in the MMEL, for numbering individual pages in this section.

- An example of this numbering system would be the communications page; the first page would be 23-1; the second page would be 23-2.

4.4.2 INDIVIDUAL ITEMS OF EQUIPMENT

A. The MMEL contains listed items of installed equipment that may be inoperative.

B. Each item title on the operator's MEL will generally be entered exactly as it is shown on the MMEL. Exceptions include the following –

- **MMEL Items not listed on the Operator's MEL.** If items listed on the MMEL are not listed on the MEL there is no relief.
- **MMEL Items Listed on the Operator's MEL.** Each piece of equipment that is installed on the aircraft and that is contained in the MMEL, for which the operator seeks relief and that is appropriate for its operation, should be listed on the appropriate page of the operator's MEL within the associated ATA system.

- When the MMEL uses a generic term to address equipment that serves a similar function but various operators use different names for that equipment; or
- When the MMEL lists functions rather than individual pieces of equipment within that category (Examples include “Navigational Equipment” or “Communications Equipment.”
- In such cases, the MEL must contain a list of the individual equipment or systems within that category that are actually installed on the aircraft, such as ‘VHF Communications Transceivers”
- When items of this type consist of several components of a system, the item may be listed as a complete system, such as “VOR Navigation System”, consisting of a VOR navigation receiver and its associated indicator.
- The operator should ensure that they have not listed inappropriate items or items that are listed individually elsewhere in the MMEL.
- However, the CAAB is authorized to approve generic MMEL relief for navigation or communication equipment that is appropriate such as ILS, VOR, VHF, HF and GPS.

The operator may be more restrictive than permitted by the MMEL by not listing certain items in its MEL

4.4.3 ITEMS LISTED ON THE MMEL BUT NOT INSTALLED ON THE OPERATOR’S AIRCRAFT

A. The operator may consider several acceptable methods of dealing with an item of equipment being listed on the MMEL but not installed on the operator’s aircraft.

Some individual item numbers on a page are not necessarily ATA code numbers, but are simply sequential item numbers within an ATA category

- 1) One method is to simply omit the item from the MEL altogether, re-numbering individual items within an ATA category as necessary to provide proper continuity.
- 2) Another method is to list the item as shown on the MMEL, and to show the number installed as zero. In this case –
 - a) The “Number Required for Dispatch” would also be zero.
 - b) The remark “Not installed” may not be noted under “Remarks and Exemptions”
 - c) Repair category designators should be omitted.

4.4.4 TRIPLE ASTERISK SYMBOL (***)

The triple asterisk symbol is used in a United States FAA-MMEL to indicate that an item is not installed on some models of the aircraft.

Operators should not produce or use this symbol in the MEL

4.4.5 REPAIR CATEGORY

- A. Each item of equipment listed in the operator's MEL, except for administrative Control Items and Passenger Convenience Items, must include the repair category designator for that item as shown on the MMEL.
- B. These designators, categorized as "A", "B", "C" and "D", indicate the maximum time that an item may remain inoperative before repair is made.
- C. The actual repair categories corresponding to these letters are provided in the "Notes and Definitions" section of the MMEL.
- D. The operator may choose to adopt a more restrictive repair category than the one shown on the MMEL, but may not relax the requirement.
- E. Components or sub-systems of items categorized in the MMEL, such as items of communications or navigation equipment that are not listed individually in the MMEL, must retain the repair category shown on the MMEL when listed as separate items on the MEL.

4.4.6 PASSENGER CONVENIENCE ITEMS

- A. Passenger convenience items relate to the convenience, comfort and entertainment of passengers and must never affect the airworthiness of the aircraft.
- B. These items do not carry a specific repair category; however, the operator should make repairs to convenience items within reasonable time frame.
- C. Normally, the operator lists these items individually in ATA chapters 25 and 38
 - Passenger convenience items may be included elsewhere in the MEL if clearly identified as passenger convenience items
- D. POIs should review the proposed MEL to decide which passenger convenience items are components of an item appearing in the MMEL.
 - 1) When listing passenger convenience items on the MEL, the operator must list each item for which the operator wishes relief.
 - 2) The operator may make a list of passenger convenience items that, once it is acceptable to the CAAB is held at the CAAB office.

Passenger convenience items also apply to cargo airplanes, as appropriate.

4.4.7 ADMINISTRATIVE CONTROL ITEMS

- A. 'Administrative control item' means an item listed by the operator in the MEL for tracking and informational purposes.
 - It may be added to an operator's MEL with the approval of the CAAB, provided no relief is granted, or provided conditions and limitations are

contained in an approved document (such as Structural Repair Manual or Airworthiness Directive (AD)).

- B. If relief other than granted by an approved document is sought for an administrative control item, the operator must submit a special request to the CAAB.
- C. If the request results in review and approval by the State of the Manufacture, the item becomes an MMEL item rather than an administrative control item.
 - Examples of items that could be considered administrative control items are cockpit procedure cards, medical kits and life vests. These items should appear in the appropriate ATA chapter and would not have a repair category.
- D. When the operator chooses this course of action, the CAAB will examine each proposed administrative control item on the operator's proposed MEL to ensure that the following conditions are met –
 - No item is included as an administrative control item if it is included elsewhere in the MMEL
 - Administrative items are not included as a subsystem of items listed in the MMEL
 - Administrative items are not granted relief in the MEL unless the release conditions or limitations are contained in another approved document.

4.4.8 NUMBER OF ITEMS INSTALLED

The MEL will normally contain the actual number of items of particular equipment installed on the aircraft. The number may be either greater or less than the number shown on the MMEL.

- The MMEL shows the number of items installed as the number of those items normally installed on a particular aircraft type.
- Individual aircraft operated by an operator may have different number of items.
- Frequently the MMEL shows a dash in the "Number Installed" column. This dash indicates that a variable quantity of these items are generally installed on the aircraft.
- If the operator has a MEL for a single aircraft or identical aircraft, the actual number of these items on the particular aircraft must be listed in the MEL.
- If the operator has a MEL for multiple aircraft and the equipment is not installed on all aircraft or there is a variable quantity between aircraft, the operator's MEL will not reference specific aircraft identifications; the "Number Installed" column may contain a dash.

4.4.9 NUMBER OF ITEMS REQUIRED FOR DISPATCH

Normally, the number of items required for dispatch is determined by the State of the Manufacturer and may be modified in the MEL in only two cases:

- When the item is not installed on the aircraft, in which case a zero may be shown as the number required for dispatch.
- When the item is shown in the MMEL as being a variable number required for dispatch

In this case, the reviewing inspector should ascertain that the operator has made a determination as to the number required for dispatch. There can be several factors that establish this number.

- In some cases, it is determined by a reference to specific requirements listed in the “Remarks or Exceptions” column of the MMEL.
- An example would be cabin lights. In this case, the MMEL may show a variable number installed while the “Remarks or Exceptions” column might state that 50% of those items be operable. The number required for dispatch would therefore be 50% of the number of lights determined to be actually installed on the individual aircraft.
- Another case where the MMEL may show a variable number required for dispatch is when the ‘Remarks or Exceptions’ column of the MMEL contains the statement, “As Required by FAR.’ In this case, the number is the minimum quantity of these items that must be installed for operations under the least restrictive regulation under which the operator conducts operations. For example, BCARs as differing requirements for when two communications transmitters are necessary for Instrument Flight Rules (IFR). Sometimes only one transmitter is required and none are required for visual flight rules (VFR) operations when operating outside of controlled airspace. If none are required, the minimum number of transmitters required for dispatch could be zero.
- “Remarks or Exemptions.” Certain items demand that specific relief be developed by the operator as authorized through the OpSpecs, area of operation and applicable regulations “As required by FAR (USA-FAA)” is an example of this type of relief.
- Other items. Other items in which relief has been specifically written to reflect actions or restrictions to the operation may be changed only when the State of Manufacture makes a change to the MMEL. Generally they contain “O” and “M” procedures in which the operator develops its company procedures to comply with the MEL.

4.5 EVALUATION OF ASSOCIATED DOCUMENTATION

The CAAB will evaluate the supporting documentation submitted by the operator to ensure that it is complete and appropriate.

4.5.1 THE OPERATOR’S MANUAL

- A. The CAAB will evaluate the operator’s manual to ensure that it contains adequate guidance for the operator’s personnel in conducting operations using the MEL.
- B. Generally, if the operator does not presently have a MEL programme, the applicable portions of this manual and other guidance material should be submitted at the time the MEL is submitted for initial review.

4.5.1.1 Documentation Procedures

The procedures for documenting inoperative equipment and any required maintenance release procedures should be clear. At a minimum, provisions for recording the following items should be developed -

- An identification of the item of equipment involved

- A description of the nature of the malfunction
- An identification of the person making the entry
- The MEL item number for the equipment involved.

4.5.1.2 Crew Notification

- A. The operator should establish procedures for advising the pilot-in-command (PIC) of inoperative items and required procedures such as affixing placards, alternate operating procedures and instructions for the isolation of malfunctions.
- B. The PIC and the operator are both responsible for ensuring that flights are not dispatched or released until all of the requirements of the “O” procedures and “M” procedures have been met.

4.5.1.3 Flight Restrictions

- A. The operator should establish procedures to ensure that dispatch or other operational control personnel, as well as the flight crew, are notified of any flight restrictions required when operating with an item of equipment that is inoperative.
- B. These restrictions may involve maximum altitudes, limitations for the use of ground facilities, weight limitations or a number of other factors.

4.5.1.4 Training Programme Material

The operator should ensure that their flight and ground personnel training programmes contain adequate instruction for use of MEL.

4.5.2 TERMS AND CONDITIONS OF RELIEF

- A. This section contains the terms and conditions of relief granted to an operator for operating the aircraft with items of installed equipment that are inoperative.
- B. The operator must state the terms and conditions under which operations may be conducted with inoperative items for the operator’s particular organization and aircraft.

4.5.3 STANDARD PHRASEOLOGY

When developing the MEL, the operator should use the phraseology used in the MMEL to ensure clarity and standardization.

In some cases modified phraseology is appropriate for the operator’s specific installation.

4.5.4 “AS REQUIRED BY FAR”

The general term, “As required by FAR,” that appears in MMELs issued for aircraft certificated in the United States will be found in ATA chapters 23 (Communications), 31 (Instruments), 33 (Lights) and 34 (Navigation Equipment).

- The operator’s MEL must clearly establish the actual requirement for its operation when the MMEL stipulates “As Required by FAR”
- It is not acceptable for the MEL to simply refer to the BCARs requirements.

- When this term appears the “Remarks or Exceptions” section of an MMEL, the operator’s MEL must contain the specific conditions that apply.
- The operator usually research the applicable regulations in detail to develop the appropriate provisions that apply to that operator’s particular operations.
- An example of a typical Distance Measuring Equipment (DME) remark could read, “Not required for flights below FL 240.”

4.5.5 “O” and “M” PROCEDURES

A. “O” and “M” procedures must contain descriptions of the individual steps necessary to accomplish each process. Each procedure should contain –

- 1) “Who” must accomplish the procedure;
- 2) “What” the goal of the procedure is;
- 3) “When” the procedure is required;
- 4) “Where” the procedure will be accomplished; and
- 5) “How” the procedure is accomplished. (The detailed steps, actions and order that must be used).

While the operator should ensure that the procedures are detailed and explicit, it is not necessary that the operator repeat obvious requirements of the

- MEL item;
- BCARs; or
- Other established standards.

- For example, if the MMEL contains a “M” symbol with a provision that a valve must be closed, the operator must include detailed steps and actions for closing and testing the valve and installing the placard

B. The actual written procedures may be contained -

- 1) Within the “Remarks or Exemptions” section of the MEL;
- 2) In separate documents; or
- 3) Attached as an appendix.

The CAAB will not authorize MEL relief unless acceptable “O” and “M” procedures are provided by the operator.

C. Operators should consult the guidelines for “O” and “M” Procedures of the MMEL when developing these procedures.

When operations (“O”) or Maintenance (“M”) procedures are required per the MMEL, it is the operator’s responsibility to develop appropriate procedures or to use manufacture developed procedures in order to meet the requirements for inclusion of the item on the MEL

- The section about guidelines for “O” and “M” Procedures does not have to be contained within the operator’s MEL.
- If the “O” and “M” procedures are not contained within the MEL, the MEL should include a reference to the location of the procedures.

4.5.6 “O” PROCEDURES

- A. The (“O”) symbol indicates a requirement for a specific operations procedure, that must be accomplished in planning for and/or operating with the listed item inoperative
- Normally, these procedures are accomplished by the flight crew however, other personnel may be qualified and authorized to perform certain functions.
- B. The satisfactory accomplishment of all procedures, regardless of who performs them, it is the responsibility of the operator.

Appropriate procedures are required to be published as part of the operator’s manual or MEL

4.5.7 “M” PROCEDURES

- A. The (“M”) symbol indicates a requirement for a specific maintenance procedure which must be accomplished prior to operation with the listed item inoperative.
- Normally these procedures are accomplished by maintenance personnel however, other personnel may be qualified and authorized to perform certain functions.
- B. Procedures requiring specialized knowledge or skill, or requiring the use of tools or test equipment should be accomplished by maintenance personnel.
- C. The satisfactory accomplishment of all maintenance procedures, regardless of who performs them, is the responsibility of the operator.

Appropriate procedures are required to be published as a part of the operator’s manual or MEL.

4.5.8 PROVISOS

- A. The “Remarks and Exceptions” section of the MMEL generally contains provisos that include specific conditions under which an item of equipment may be inoperative.
- B. Provisos are distinct from “O” and “M” procedures. A procedure is an action that must be performed. A proviso is a condition that must exist.
- For a proviso that operations must be conducted under VFR, an operation under a IFR flight plan is not permitted, regardless of the weather conditions.
 - When reference is made to Visual Meteorological Conditions (VMC), operations may be conducted under IFR flight plan, but only in VMC.

These provisos must be carried over either verbatim into the operator’s MEL or using equivalent terminology.

SECTION 5 USE OF MEL IN SERVICE

This section contains specific direction, guidance and procedures regarding the revision, administration and policy application for administering MELs that have been approved for use by air operator's operating under the provisions of BCARs (AOC) Administration.

5.1 REVISIONS TO AN MEL

- A. Revisions to an operator's MEL may be initiated by either the operator or the CAAB.
- B. Operator-initiated revisions may be equal to or more restrictive than the Master Minimum Equipment List (MMEL).
- C. The minimum submission would consist of only the affected pages; the approval by the CAAB may only consist of the specific items.
- D. These items are approved within a controlled process, and the carrier will produce the final MEL document.
- E. If the revision results in individual pages either being added or deleted, a revised table of contents page is also required.

It is not necessary for an operator to submit an entire MEL when requesting the approval of a revision.

5.2 MEL REVISION INITIATED BY AN OPERATOR

An operator initiated MEL revision will normally fit into one of the following three categories –

- 1) Items Not Requiring an MMEL Change.
 - Operators may propose changes to an MEL that are equal to, or more restrictive than the MEEL
 - These revisions are approved by the CAAB using the same procedures as those required for an original MEL approval.
- 2) Items Requiring an MMEL Change
 - Operators may propose changes to an MEL that are less restrictive than the MMEL.
 - However, the MEL cannot be revised until the MMEL has been revised to permit the proposed MEL change.
 - The most common instance of a revision request of this type occurs when an operator installs additional equipment on an aircraft and provisions for that equipment are not included on the current MMEL.
- 3) Major Aircraft Modifications
 - Major aircraft modifications, such as a Supplemental Type Certificate, a major alteration CA Form 41, "Major Repairs and Alterations") or a Type Certificate (TC) amendment, may invalidate the MEL for that aircraft.

- Operators should review the MEL to assess the impact of any planned modification and should immediately notify the CAAB of these modifications and the impact on the MEL.

5.3 MEL REVISIONS INITIATED BY THE CAAB

5.3.1 Non-Mandatory Revisions

- A. MMEL revisions that only provide the additional relief are reflected by a lower case letter suffix following the MMEL numeric revision number.
- For example, MMEL Revision No. 10 would become Non-mandatory Revision No. 10a.
- B. Any MMEL changes that are less restrictive than the operator's MEL may be ignored by the operator.
- An example of a non-mandatory revision is when the MMEL has been revised to provide for optional equipment normally not installed on all aircraft of a particular type, such as logo lights.
 - Operators that operate aircraft with logo lights may choose to revise the MELs, while the operators operating without logo lights would not.

5.3.2 GLOBAL CHANGE

- A. A global change is another type of non-mandatory revision. A global change generally applies to items of equipment that are required to be installed by a new regulatory requirement, such as a Cockpit Voice Recorder (CVR), or a Traffic Alert and Collision Avoidance System (TCAS).
- B. Items affected by CAAB policy decisions, such as Observer Seat Notice are also global changes.
- C. The global change does not replace the normal MMEL revision process. When a standard revision to an MMEL is issued, it will include all global changes issued to date.
- D. However, since the process for revising the MMEL can be lengthy and the operator's MEL must be based on the current MMEL, a global change will allow an operator to revise its MEL prior to the change in the MMEL.

The CAAB has the authority to approve the operator's MEL revision on the basis that the global change is an approved addendum to the existing MMEL.

5.4 MANDATORY REVISIONS

- A. Mandatory changes, which are more restrictive and may remove relief from the current MMEL, are reflected by the next successive change to the basic MMEL revision number itself.
- For example, the next mandatory revision following the non-mandatory revisions 4a, 4b or 4c would be revision 5.
- B. Any MMEL changes that are more restrictive than the operator's MEL will be implemented by the operator as soon as possible.

- C. In some cases when relief is removed from the MMEL, there will be a specific date for compliance, or guidance for an acceptable date to be negotiated between the CAAB and the operator.

5.4.1 CAAB INITIATED REVISION

- A. The CAAB may initiate a MEL revision that is not based on a revision to the MMEL. The CAAB will make such a request to the operator in writing, stating specific reasons why the revision is necessary.

A CAAB initiated revision may be made upon the discovery that an operator has modified an aircraft or that faulty maintenance or operations procedures exist.

- B. The CAAB will work closely with the operator and make every effort to resolve the matter in a mutually agreeable manner.

- C. The operator should be given a reasonable time period to make the changes depending on whether safety of flight is affected.

In the event that the operator declines to make the required change, the CAAB may elect to initiate an amendment of the operator's OpSpecs to rescind the authority for the MEL.

5.4.2 MODIFICATIONS WITHIN A FLEET

- A. If an operator has been granted approval to use the MEL for a fleet, and the operator installs a new piece of equipment in one or more aircraft, the operator may continue to operate that aircraft under the provisions of the currently approved MEL.
- B. The operator may not defer repair of the new item until appropriate revision to the MEL has been approved.

SECTION 6 OPERATIONAL USE OF MEL

6.1 AVAILABILITY OF MEL FOR FLIGHT CREW MEMBERS

- A. Civil Aviation Regulations require that flight crew members have direct access to the MEL at all times prior to flight.
- B. The operator may choose to also incorporate another system of access to the MEL other than the MEL document.
- For example, the flight crew may obtain access to the MEL through the ARINC Communications Addressing and Reporting System (ACARS).
- C. The critical element in approving an alternate form of access is whether or not the flight crew has a direct means of access to the appropriate information in the MEL, specifically "O" and "M" procedures.
- 1) Direct access should not be construed to mean access through telephone or radio conversations with maintenance or other personnel.
 - 2) If the operator chooses to provide the flight crew with access to the MEL by other than printed means, the method must be approved in the operator's MEL programme.

6.2 METHOD OF AUTHORIZING CREWMEMBER ACCESS TO MEL

- A. The CAAB may approve a method other than printed means of providing the flight crew with access to the MEL as provided in the regulations.
- B. Before authorizing such a method, the CAAB must determine that the operator has an adequate means in place to provide flight crews with the complete equivalent of the actual text of the MEL.

When the decision is made to authorize an alternative method, the CAAB approval will include a reference to the operations manual.
- C. This method must be described in detail in the operator's CAAB approved operations manual or equivalent.

6.3 DISCREPANCIES DISCOVERED DURING FLIGHT

6.3.1 General Guidance

- A. Use of the MEL is not applicable to discrepancies or malfunctions that occur or are discovered during flight.
- B. Once an aircraft moves under its own power, the flight crew must handle any equipment failure in accordance with the approved flight manual.

A flight is considered to have departed when the aircraft moves under its own power for the purpose of flight.

6.3.2 Before Take off

Discrepancies occasionally occur between the time the flight departs and the time it takes off. There are two similar scenarios –

- 1) Commercial Air Transport, or
- 2) General Aviation and Air Taxis.

6.3.2.1 Commercial Air Transport

- A. For those operators who are required to use a flight release, the Pilot –in-Command (PIC) must handle a discrepancy that occurs after the issuance of the release, but before the flight departs, in accordance with the MEL.
- B. The PIC must obtain a new or amended dispatch or flight release, as well as any required airworthiness release.

This new or amended release must contain any applicable flight restrictions necessary for operation with any item of equipment that is inoperative.

6.3.2.2 General Aviation

- A. If the flight manual contains procedures for handling that discrepancy, or if the (PIC) deems that the discrepancy does not affect the safety of flight, the flight may continue.
- B. The discrepancy must be addressed prior to the next departure.

6.3.3 DOCUMENTATION OF DISCREPANCIES

- A. Provisions of the MMEL preamble require that an airworthiness release be issued or an entry be made in the aircraft maintenance record or logbook prior to conducting any operations with items of equipment that are inoperative.
- B. The operator must have adequate methods for recording the authorization to operate the aircraft with items of equipment that are inoperative.
- C. Unless maintenance actions are performed on the aircraft, AOC holder's flight crews may make appropriate documentation in the aircraft maintenance log required by applicable regulations.

This does not imply that the involvement of a Botswana licensed mechanic or other person authorized under BCARs to approve an aircraft for return to service is required in all cases.

6.3.4 CONFLICT WITH AIRWORTHINESS DIRECTIVES

- A. The operator's MEL Management Programme should incorporate procedures for situations where an AD may apply to an item of equipment that may be authorized to be inoperative under the MEL.
- B. The item may not simply be deferred under the MEL in order to avoid or delay compliance with the AD or a State of Manufacture approved alternate means of compliance with the AD.
- C. The State of Manufacture must approve any alternative method of compliance with the AD as provided in the AD.
- D. In other cases, the provisions of an AD may allow operation of the aircraft on the condition that certain items of installed equipment be used or operable.

This programme should ensure that no dispatch of aircraft occurs except in compliance with the AD.

In all cases, when an AD has been issued, the operator must comply fully with the terms of the AD or a State of Manufacture approved alternate means of compliance with the AD

In those cases, the affected items must be operable even though the MEL may provide for deferral of repair.

6.3.5 INTER-RELATIONSHIPS OF INOPERATIVE COMPONENTS

- A. When the MEL authorizes a component of a system to be inoperative only that component may be affected.
- When a system is authorized to be inoperative, individual components of that system may also be inoperative.
 - Any warning or caution systems associated with that system must be operative unless specific relief is authorized in the MEL.
- B. The operator must consider the inter-relationship of inoperative components during the development of the MEL. This consideration must include the following –
- The inter-relationship of one piece of equipment on another
 - The crew workload
 - The operation of the aircraft

- The flight restrictions

6.3.6 REPAIR CATEGORIES

- A. When an item of equipment becomes inoperative and repair is deferred under a MEL, the operator must make repairs as specified by the associated repair category designator (“A”, “B”, “C” or “D”) and the operator’s MEL Management system.
- B. In the event that more items are installed than those that are required for normal operation, the “C” repair category may be used.
- For example, if one altitude alerting system is required and the associated repair category is “B”, but there are two such systems installed, failure of the first system could be deferred as specified for a “C” category item (10 days).
 - Failure of the remaining system would limit at least one system to the “B” repair category item (3 days).

Refer to the definitions sections of the MMEL for an explanation of repair categories.

SECTION 7 DEVELOPMENT & ACCEPTANCE OF A CDL

7.1 STATE OF DESIGN

- A. An aircraft manufacturer develops a proposed CDL for a specific aircraft type. The proposed CDL is submitted to the responsible State of Design for approval by engineering specialists.
- B. The State of Design will then co-ordinate with the appropriate aircraft evaluation group to resolve any problems and discrepancies prior to approving the CDL.
- For the United States (US) certificated airplanes, the CDL, once approved, is incorporated into the limitations section of the Airplane Flight Manual (AFM) as an appendix.
 - For other manufacturers, the CDL may be a stand alone document and part of the Structural Repair Manual, or another manufacturer’s document.

7.2 SUBMISSION OF A CDL

- A. The operators should submit a copy of the CDL with their MEL for easy and ready reference by flight crews.
- B. Operators should establish procedures to follow the CDL limitations when operating with a configuration deviation. Operators are required to observe the following –
- The limitations in the CDL when operating with certain equipment missing (except as noted in the appendix to the approved flight manual)
 - The flight operations, restrictions or limitations that are associated with each missing airframe and engine part

- Any placard(s) required by the CDL describing associated limitations, which must be affixed in the cockpit in clear view of the Pilot-in-Command (PIC) and other appropriate crew members.

7.3 CDL PROCEDURES

The operator must develop appropriate procedures for the PIC and if appropriate, procedures for notifying dispatch of the CDL missing parts by an appropriate notation in the aircraft logbook or other acceptable means.



For/Civil Aviation Authority of Botswana



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End of Advisory Circular