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## NATA Aircraft Maintenance & System Technology Committee Best Practices

### *Minimum Equipment List (MEL)*

The Minimum Equipment List (MEL) is a document and method aircraft operators use to obtain relief from Federal Aviation Regulations requiring that all equipment installed on the aircraft be operative at the time of flight. It is aircraft-specific and spells out which pieces of equipment may be allowed to be inoperative along with any procedures that are required for an aircraft to operate under specific conditions while maintaining airworthiness.

The MEL is developed from the Master Minimum Equipment List (MMEL), which is produced by the aircraft manufacturer and approved during certification of the airplane. The MMEL is used by individual operators to develop their MEL and takes into consideration an operator's more particular equipment, instrument and operational conditions. Operator MELs for administrative control may include items not contained in the MMEL; however, the Federal Aviation Administration (FAA) must approve the administrative control items. An operator's MEL may differ in format from the MMEL, but cannot be less restrictive than the MMEL. When the individual operator's MEL is approved and authorized, it then becomes a Supplemental Type Certificate (STC), and permits operation of the aircraft with inoperative equipment.

The FAA has MMELs for most of the type-certificated aircraft in use today. These MMELs can be found on the FAA's Flight Standards Information Management System (FSIMS) under the Publications, or by going to <http://fsims.faa.gov/PublicationForm.aspx>

There is also an MMEL Industry/FAA Group designed to assist the FAA in the development of MMEL policy and revisions. The goal of the group is to harmonize and gain consensus on MMEL issues, capitalize on the expertise of the aviation industry, and reduce the FAA's workload in the development of MMEL policy and revisions.

#### **Background**

The MEL concept originally applied to air carriers, commercial operators and those general aviation operators of multi-engine aircraft for which the FAA had developed an MMEL. Operators of aircraft for which the FAA had not developed an MMEL had to ensure that all

aircraft discrepancies occurring during the normal operation of the aircraft were repaired before the aircraft could be operated again. This meant that all the aircraft's instruments and equipment, regardless of whether they were essential or not to the flight operation, had to be operative. The regulation placed a huge burden on many aircraft operators and put them at risk of being out of compliance.

In 1989, the FAA revised the regulations to those we have today; operators can fly their aircraft with inoperative instruments and equipment, under a framework of a controlled maintenance and inspection program, including repairs and parts replacement.

### **Regulatory Requirement**

Title 14 CFR section 91.205 lists the aircraft equipment and instruments that must be installed and requires the instruments and equipment to be in an operable condition. Part 91, section 91.213, addresses inoperative equipment and provides relief from section 91.205 through the use of an FAA-approved MEL. It allows for the operation of aircraft with instruments and equipment in an inoperable condition. The regulation also provides a list of instruments and equipment that may not be included in an MEL. For example, instruments and equipment that are either specifically or otherwise required by the airworthiness standards under which the aircraft is type certificated and which are essential for safe operations under all operating conditions, or instruments and equipment required by an airworthiness directive to be inoperable, unless the airworthiness directive provides otherwise, may not be included in an MEL.

### **MEL Operations and Maintenance Procedures**

An MEL is intended to permit operation with inoperative instruments or equipment for a period of time until repairs can be accomplished – it is not a “free pass.” Repairs must be accomplished at the earliest opportunity.

To maintain an acceptable level of safety and reliability, the MEL establishes limitations on the duration of and conditions for operation with inoperative equipment. When inoperative equipment is discovered, the regulations require that it be reported via proper entry in the aircraft maintenance record/logbook. The item is then repaired, or deferred for repair but deactivated and placarded by an appropriately certificated maintenance person (per 43.7) per the MEL or other approved means acceptable to the FAA, prior to further operation.

MEL conditions and limitations do not relieve the operator from determining that the aircraft is in condition for safe operation with items of equipment inoperative, and the deactivation of one inoperative system should not reduce the performance of any other instruments or equipment.

“(O)” and “(M)” procedures must contain descriptions of the individual steps necessary to accomplish each operation or maintenance function. For example, if the MMEL contains an “(M)” symbol with a provision that a valve must be closed, the operator must include the appropriate maintenance procedures to close the valve as part of the operator’s manual or MEL.

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, the flight crew accomplishes these procedures; however, other personnel may be qualified and authorized to perform the functions. The satisfactory accomplishment of all 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.

The “(M)” symbol indicates a requirement for a specific maintenance procedure, which must be accomplished prior to operation with the listed item inoperative. Normally, maintenance personnel accomplish these procedures; however, other personnel may be qualified and authorized. Procedures requiring specialized knowledge or skill, or requiring the use of tools or test equipment should be accomplished by maintenance personnel. Like the “(O)” procedures, the satisfactory accomplishment of all maintenance procedures, regardless of who performs them, is the responsibility of the operator. The appropriate procedures are required to be published as part of the operator’s manual or MEL as well.

The “Remarks and Exceptions” section of the MMEL generally contains provisos that include specific conditions under which an item of equipment may be inoperative. These provisos must be carried over either verbatim into the operator’s MEL or by using equivalent terminology. 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 example, a proviso that operations must be conducted under VFR, an operation under an IFR flight plan is not permitted, regardless of the weather conditions).

Where the MMEL states “as required by 14 CFR,” the procedures document should list the particular regulation by part and section or describe the actual 14 CFR requirement applicable to the operator’s particular operation (for example, where the regulation requires a clock for IFR flight, the operator’s procedures document should say “May be inoperative for VFR).

- If the “(O)” and “(M)” procedures are already stated in the AFM, the maintenance manual, or other available FAA-approved source, the operator needs only to show the reference. If the operator uses this reference format in the procedures document, the referenced source must be readily available to the ground support personnel and a copy of the references source must be carried in the aircraft and be readily available to the flight crew.

- If “(O)” and “(M)” procedures are not in the AFM, maintenance manual, or other available FAA-approved source, or if the operator wishes to use a different procedure, the operator must list the procedure in the procedures document.

The procedures document may not conflict with AFM limitations, emergency procedures, ADs, or the aircraft maintenance manual.

### **Repair Intervals**

The repair interval categories (A, B, C, and D) listed in column 1 of the MMEL apply only to operations conducted under Parts 121, 125, 129, and 135.

All users of an MEL approved under Parts 91K, 121, 125, 129, and 135 must effect repairs of inoperative systems or components, deferred in accordance with the MEL, at or prior to the repair times established by the following letter designators:

**Category A.** This category item must be repaired within the time interval specified in the remarks column of the certificate holder’s approved MEL.

**Category B.** This category item must be repaired within 3 consecutive calendar-days (72 hours), excluding the day the malfunction was recorded in the aircraft maintenance record/logbook. For example, if it were recorded at 10 a.m. on January 26, the 3-day interval would begin at midnight on January 26 and end at midnight on January 29.

**Category C.** This category item must be repaired within 10 consecutive calendar-days (240 hours), excluding the day the malfunction was recorded in the aircraft maintenance record/logbook. For example, if it were recorded at 10 a.m. on January 26, the 10-day interval would begin at midnight on January 26 and end at midnight on February 5.

**Category D.** This category item must be repaired within 120 consecutive calendar-days (2880 hours), excluding the day the malfunction was recorded in the aircraft maintenance log and/or record.

The FAA does have policy in Order 8900.1 to allow continuing authorizations (extensions). The policy, states that if a certificate holder or program manager has the authorization to use an FAA-approved MEL they also have the authority to use a continuing authorization to approve a single extension to the repair interval for category B or C items (3 days and 10 days respectively). The certificate holder/program manager needs to notify the responsible FAA field office within 24 hours of the use of the extension authority. This authorization is good for a one-time extension. If the operator wants or needs to extend the interval again, the operator must get approval from the FAA office. A certificate holder/program manager is not authorized to extend the maximum repair time for category A and D items, as specified in the approved MEL.

## **MEL Approval Process**

Whether you are a Part 91 operator or a commercial operator, an FAA operations inspector, or in the case of a commercial operator, the principal operations inspector (POI) assigned to the certificate, will be the primary FAA official responsible for the overall process of evaluating, and approving an MEL document. The POI or operations inspector works with the corresponding principal maintenance and principal avionics inspector to complete the review and approval of the MEL. The principal maintenance inspector is responsible to evaluate and approve a certificate holder's MEL Management Program as prescribed in operations specification (OpSpec)/management specification (MSpec) D095, Minimum Equipment List (MEL) Authorization. If you are a Part 91 operator, the same FAA personnel are involved; however, the outcome is the issuance of a Letter of Authorization (LOA) instead of operation specifications.

In either case, the operator must develop and submit to the FAA the Operations (O) and Maintenance (M) procedures using guidance contained in the manufacturer's aircraft flight and maintenance manuals, the manufacturer's recommendations, engineering specifications.

The POI will begin the review of the MEL package when he or she finds the proposed MEL to be complete and to contain the required information. This is usually where the issues can begin for an operator. Even though the inspector should compare the MEL to the MMEL, the review or analysis process can be frustrating and challenging. Usually, the issues surround the "(O)" and "(M)" procedures, the length of time allowed for deferral, or the parts management portion of the MEL management program. Secondly, even though the FAA guidance tells the inspector that he or she should conduct a timely review there can be delays. There have been complaints by operators in the industry that MELs can remain in an FAA office up to a year without any action. Of course, it is a two-way street. The operator should also be responsive and not let the MEL linger in their office.

If an operator finds themselves in a situation where the review is taking too long, or no action is being taken at all, there is the option of elevating the issue to the supervisor or manager. Unfortunately, there is no standard answer on how to proceed; it usually depends on the relationship between the operator and the FAA office. MEL development is not for the weak of heart. The operator should make sure it has the experience on hand to manage the process.

After the POI completes the final review and is satisfied that the MEL meets the applicable requirements, the POI will sign the MEL control page or the individual MEL pages to signify approval and the PMI will issue OpSpec/MSpec D095.

Part 91 operators, who apply to the FAA for an MEL, will receive an LOA that authorizes the use of the MEL and is specific to the aircraft make, model, serial number and registration

number.

MELs and LOAs are not transferrable with the sale of an aircraft. If an operator sells an airplane with an MEL or LOA, the documents should be returned to the FSDO. If an operator changes locations and moves out of one FAA district office jurisdiction to another or even to a different part of the country, the operator needs to notify both of the FAA offices. The previous office should forward the MEL file to the new FAA office. Again, this is where industry has complained that an inspector in the new office will require that the operator resubmit its MEL for approval. However, that is neither what the regulations nor the inspector guidance states, and in those situations the operator may want to raise his concerns.

FAA Order 8900.1 Volume 4 Chapter 4 section 7 MEL Approval Process for 14 CFR 91K, 121, 135, and 129 Operators and AC 91-67 MINIMUM EQUIPMENT REQUIREMENTS FOR GENERAL AVIATION OPERATIONS Date: 6/28/91, contains detailed information about the MEL submission, review and approval process.