

**CHAPTER 4**  
**INOPERATIVE EQUIPMENT DECISION / MINIMUM EQUIPMENT**  
**LIST (MEL)**

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## **Introduction**

This chapter references FAA Advisory Circular (AC) AC 91-67 and appropriate FARs. Federal Aviation Regulations require that all equipment, as installed on an aircraft in compliance with Airworthiness Standards and the Operating Rules, must be operative. Due largely to the safety record of general aviation aircraft operators using 91.205 as their reference for determining aircraft airworthiness and safety, the FARs were amended in 1988 to allow the publication of a Minimum Equipment List (MEL) for aircraft, or the operator's utilization of 14 CFR 91.213.

Either of these options allows the operator and/or PIC to conduct operations with certain inoperative equipment and instruments. Refer to FAA Advisory Circular (AC) AC 91-67 for more information outside of this manual.

An MEL is a precise listing of instruments, equipment, and procedures that allows an aircraft to be operated under specific conditions with inoperative equipment. All aircraft must operate in accordance with a MEL, unless using specific exceptions provided by FAR 91.213(d). BSU Cessna C172R, a light, non-turbine powered aircraft, is one such exception, and can be operated without an MEL.

### **NOTE**

Bridgewater State University does **not** operate the Cessna 172 with an MEL. Apply the "No MEL" Decision sequence from this chapter (FAR 91.213(d)) when determining BSU C172R airworthiness with inoperative equipment.

The information regarding operating with a MEL is provided in the interest of complete understanding of the regulations involved.

## ***OPERATING WITHOUT AN MEL***

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### **Applying FAR 91.213**

This section of the manual provides guidance for flight crews who elect to conduct flight operations under the provisions of 14 CFR 91.213(d). Operating under 14 CFR 91.213(d) requires no application to or approval from the FAA.

### **No MEL Decision Sequence**

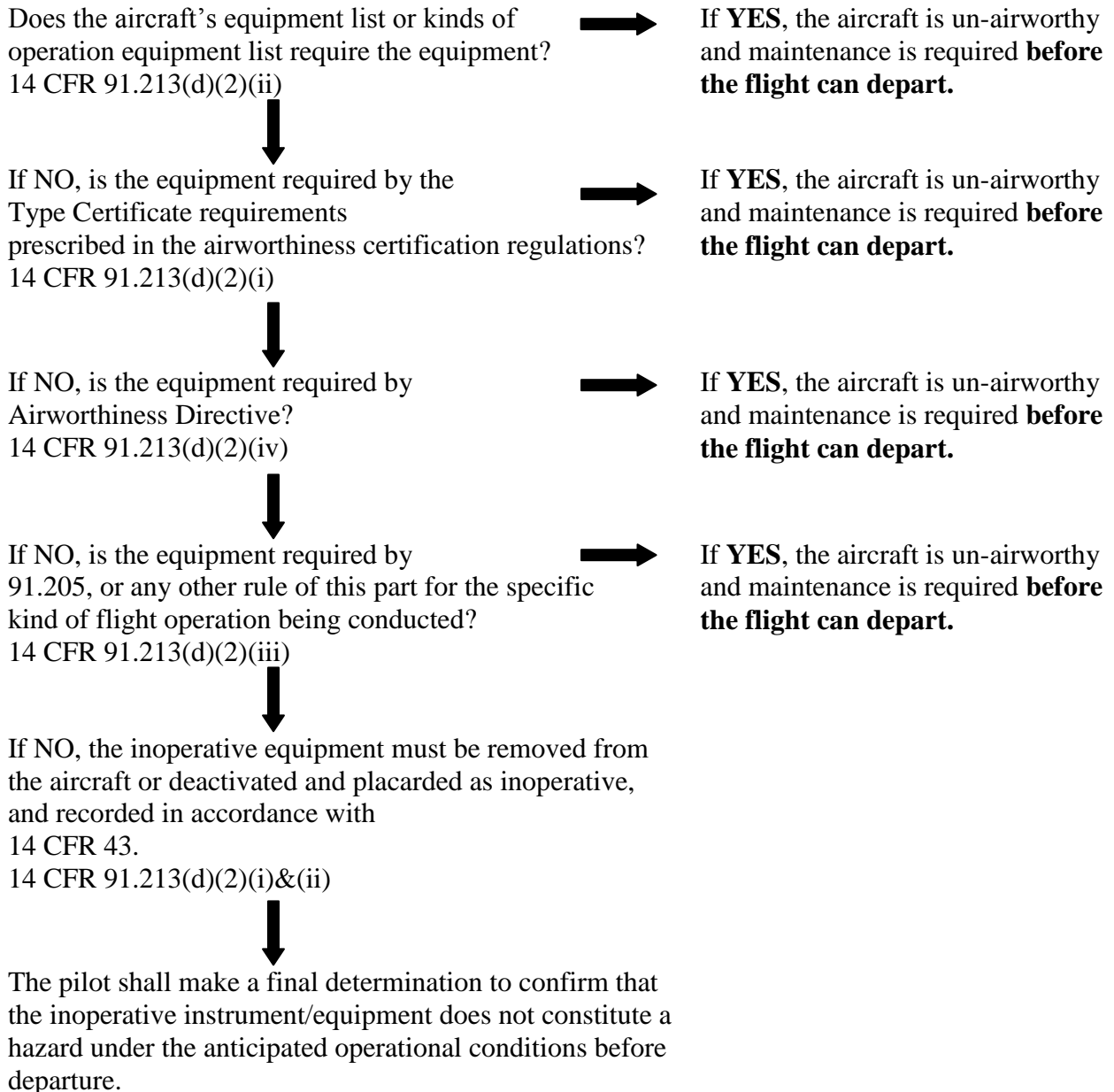
The flow chart depicts the sequence of events a flight crew should follow when inoperative equipment is discovered, and the flight will be conducted under 14 CFR 91.213(d). For example, during a preflight inspection for a VFR day cross-country flight, the flight crew discovers that the NAV #2 unit is inoperative.

- ✓ The first action the flight crew must take is to see if the aircraft's equipment list or kinds of operation equipment list require the NAV #2 unit as stated in 14 CFR 91.213(d)(2)(ii). If NAV #2 is required in the equipment list, the aircraft is not airworthy, and maintenance is required before operating the aircraft. In this example, NAV #2 is not a required instrument or piece of equipment.
- ✓ The next action is to check the airworthiness regulation under which the aircraft was certificated to determine if NAV #2 is part of the VFR day type certificate (14 CFR 91.213(d)(2)(i)). If NAV #2 is required as part of the VFR day type certification, the aircraft is not airworthy, and maintenance is required before operating the aircraft. In this example, NAV #2 is not a required instrument or piece of equipment. This action, depending on the aircraft, may require additional research into 14 CFR Part 23 or CAR Part 3.
- ✓ The next action is to check if NAV #2 is required by an Airworthiness Directive (AD). This would be accomplished by checking the aircraft's maintenance logs to see if NAV #2 was installed as a result of an AD. However, it may be necessary for the pilot to consult a qualified maintenance person to determine AD compliance. If an AD requires NAV #2 to be operative, the aircraft is not airworthy, and maintenance is required before operating the aircraft. In this example, NAV #2 is not a required instrument or piece of equipment.
- ✓ The next step is to determine if NAV #2 is required by 14 CFR 91.215, 91.205, or 91.207. This can be accomplished by checking the appropriate sections in the Federal Aviation Regulations, or by consulting a maintenance technician. If any of those regulations require NAV #2 to be operative, the aircraft is not airworthy, and maintenance is required before operating the aircraft. In this example, NAV #2 is not a required instrument or piece of equipment.

- ✓ Having completed the above steps, the final step is to ensure that NAV #2 is either removed from the aircraft, as per 14 CFR 91.213(d)(3)(i), or deactivated, as per 14 CFR 91.213(d)(3)(ii). The person removing or deactivating the NAV #2 unit must be appropriately certificated, must placard it inoperative in the appropriate location, and record the event in an appropriate record.
  
- ✓ Having completed the above stated process, the flight crew must then make a final determination to confirm that the inoperative instrument / equipment does not constitute a hazard under the anticipated operational conditions before departure.

## No MEL Decision Sequence Flow Chart

The following flowchart is designed to provide guidance to a flight crew that recognizes inoperative instruments or equipment during the preflight inspection.



**BSU C172R Kinds of Operation Equipment List**

The following equipment list identifies the systems and equipment upon which type certification for each kind of operation was based.

The equipment listed in the following table must be installed and operable for flight unless:

- A. The airplane is approved to be operated in accordance with a current Master Minimum Equipment List (M MEL) issued by the FAA, or
- B. An alternate procedure is provided in the basic FAA-Approved Airplane Flight Manual for the inoperative state of the listed equipment and the flight crew complies with all limitations.

**Kinds of Operation Equipment List**

System and/or Component	Kind Of Operation			
	Day VFR	Night VFR	Day IFR	Night IFR
<b>Placards and Markings</b>				
IFR Day and Night Limitations Placard	1	1	1	1
<b>Air Condition</b>				
Cabin Heat System	1	1	1	1
<b>Communications</b>				
Static Discharge Wicks	0	0	10	10
NAV/COM Installation With GS	1	1	1	1
Audio/Intercom/Marker Beacon Installation	1	1	1	1
Basic Avionics (Used with #1 NAV/COM)	1	1	1	1
<b>Electrical Power</b>				
Alternator, 28 Volt 60 Amp	1	1	1	1
Battery, 24 Volt, 12.75 A.H. Manifold Type	1	1	1	1

**Kinds of Operation Equipment List, Continued:**

System and/or Component	Kind Of Operation			
	Day VFR	Night VFR	Day IFR	Night IFR
<b>Equipment and Furnishing</b>				
Seat Belt and Shoulder Harness, Inertia Reel, Pilot and Front Passenger	2	2	2	2
Seat Belt and Shoulder Harness, Inertia Reel, Rear Seat	1	1	1	1
Padded Glareshield	1	1	1	1
Baggage Retaining Net	1	1	1	1
Auxiliary Fuel Pump	1	1	1	1
<b>Indicating/Recording System</b>				
Clock/OAT Indicator, Digital	1	1	1	1
Hour Recorder "Hobbs Time"	1	1	1	1
Annunciator	1	1	1	1
Stall Warning Indicator -Pneumatic	1	1	1	1
<b>Landing Gear</b>				
Wheel Brake and Tire (Main)	2	2	2	2
Wheel Brake and Tire (Nose)	1	1	1	1

**Kinds of Operation Equipment List, Continued:**

System and/or Component	Kind Of Operation			
	Day VFR	Night VFR	Day IFR	Night IFR
<b>Lights</b>				
Flashing Beacon Light on Vertical Fin Tip	1	1	1	1
Strobe Light Installation on Wing Tips	1	1	1	1
Landing and Taxi Light Installation on Wings	1	1	1	1
<b>Navigation</b>				
Indicator, Airspeed	1	1	1	1
Alternate Static Air Source	1	1	1	1
Altimeter	1	1	1	1
Magnetic Compass	1	1	1	1
Directional Gyro	1	1	1	1
Attitude Indicator	1	1	1	1
Turn Coordinator	1	1	1	1
Vertical Speed Indicator	1	1	1	1
GPS Installation	1	1	1	1
Mode C Transponder	1	1	1	1
<b>Vacuum</b>				
Vacuum System	1	1	1	1
Vacuum Gage/Ammeter	1	1	1	1
Low Vacuum Warning Light	1	1	1	1

**Kinds of Operation Equipment List, Continued:**

System and/or Component	Kind Of Operation				Remarks
	Day VFR	Night VFR	Day IFR	Night IFR	
<b>Propeller</b>					
Propeller Assembly, Fixed Pitch	1	1	1	1	
Spinner Installation, Propeller	1	1	1	1	
Filter, Air Intake, Donaldson	1	1	1	1	
Engine, Lycoming IO-360-L2A	1	1	1	1	
<b>Engine Fuel and Control</b>					
EGT/Fuel Flow Indicator	1	1	1	1	
<b>Engine Indicating</b>					
Tachometer	1	1	1	1	

## ***OPERATING WITH AN MEL***

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When an aircraft is manufactured, the FAA develops a Master Minimum Equipment List (MMEL) in cooperation with the manufacturer. The FAA MMEL contains equipment and instruments related to airworthiness and operating regulations and (possibly) other equipment the FAA determines may be inoperative without compromising safety during specified conditions and limitations; it does *not* contain obviously required items such as wings, flaps, propeller, etc.

The MMEL serves as the basis for an individual operator's MEL, which takes into consideration the operator's more particular equipment, instrument and operational conditions. Operator MELs, for administrative control, may include items not contained in the MMEL; however, relief for administrative control items must be approved by the Administrator. An operator's MEL may differ in format from the MMEL, but cannot be less restrictive than the MMEL. The individual operator's MEL, when approved and authorized, becomes a Supplemental Type Certificate (STC), and permits operation of the aircraft with inoperative equipment.

Equipment not required by the kind of operation being conducted, and equipment in excess of FAR requirements, are included in the MEL with appropriate conditions and limitations. The MEL must not deviate from the Aircraft Flight Manual Limitations, Emergency Procedures, or with Airworthiness Directives. All equipment related to the airworthiness and the operating regulations of the aircraft not listed on the MMEL must be operative.

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, FARs require that it be reported via proper entry in the approved 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 Administrator, 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.

## **MEL Decision Sequence**

The flow chart shown below illustrates the proper sequence of events a pilot or operator, operating with an MEL, follows when inoperative equipment is discovered. For example, during a preflight inspection for a VFR day flight, the pilot discovers an inoperative anti-collision light.

- ✓ Check the aircraft's MEL to determine under what, if any, flight conditions the aircraft could be operated without operating anti-collision lights. If the MEL indicates that the aircraft may be operated during daylight hours without operable anti-collision lights, the pilot still needs to complete a set flow to continue with the proposed flight.
- ✓ The pilot (if appropriately rated) next needs to check the approved procedures document and deactivate the anti-collision lights by pulling the appropriate circuit breaker and having it secured by an appropriately certificated maintenance person.
- ✓ The maintenance person then needs to place a placard near the anti-collision light switch, indicating that the lights are inoperative.
- ✓ Finally, the pilot must determine that the conditions of the proposed flight can be conducted safely without anti-collision lights.
- ✓ If the anti-collision lights are not included on the MEL, but are required by type certification, AD or other special conditions, then the aircraft is un-airworthy, and must be repaired prior to the flight.

## **MEL Decision Sequence Flow Chart**

The following flow chart provides a graphical sequence for a flight crew that recognizes inoperative instruments or equipment during the preflight inspection.

