

**BY ORDER OF THE COMMANDER
AIR FOR MATERIEL COMMAND**



AIR FORCE INSTRUCTION 21-103

**AIR FORCE MATERIEL COMMAND
Supplement
ADDENDUM_L**

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Maintenance

**EQUIPMENT INVENTORY, STATUS AND
UTILIZATION REPORTING
SYSTEM/KC/KC/C-135B/C/E/R MINIMUM
ESSENTIAL SUBSYSTEM LIST (MESL)**

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This instruction implements AFD 21-1, *Air and Space Maintenance*, AFI 21-101, *Aircraft and Equipment Maintenance Management*, and AFI 21-103, *Equipment Inventory, Status and Utilization Reporting*. It establishes policy and assigns responsibility to provide AFMC Test Fleet aircraft status changes/updates in accordance with (IAW) current maintenance conditions and the developed MDS specific mission essential subsystem list (MESL). This instruction applies to all AFMC organizations that manage or perform maintenance on AFMC owned/possessed aircraft regardless of Air Force Specialty Code. Ensure that all records created as a result of processes prescribed in this publication are maintained IAW AFMAN 33-363, *Management of Records*, and disposed of IAW the Air Force Records Disposition Schedule (RDS) located at <https://www.my.af.mil/afirms/afirms/afirms/rims.cfm>. Send comments and suggested improvements to this instruction on AF Form 847, *Recommendation for Change of Publication*, to HQ AFMC/A4MM, 462 Chidlaw Road, Wright-Patterson AFB OH 45433-5006.

These MESLs complement AFI 21-103, *Equipment Inventory, Status, and Utilization Reporting*. They apply to maintenance activities supporting AFMC test missions across AFMC.

1. General. The MESL is the basis of status reporting IAW 21-103. MESLs lay the ground work for reporting the status of assigned/possessed AFMC test fleet aircraft and equipment

supporting AFMC test missions. They list the minimum essential systems and subsystems that must work on test fleet aircraft to perform specifically assigned unit test, training or other missions.

1.1. Qualifying notes are used to define system exceptions and help explain complex degraded mission systems.

1.2. It is understood that any aircraft or support equipment system or subsystem may be subjected to test or tested under a test scenario and/or are test dependent as directed by the test mission director. If identified by test mission director, those systems or subsystems if not already identified by qualifying notes must be operational to be considered FMC or PMC for that mission.

2. Reading the MESL. A MESL is read by comparing the systems stated by WUC or UNS column (column 2) against the Full Systems List (FSL) and all applicable Basic Systems List (BSLs) across the page (DTE - Developmental Test and Evaluation, DTS - Developmental Test Support, TNG - Training). Each unit's Design Operational Capability (DOC) statement determines applicability of BSL columns. The aircraft or equipment MESLs incorporate all AFMC assigned/possessed aircraft/equipment and therefore it is important to compare only the columns listed in the MESL which are applicable to the units assigned/possessed aircraft. For example, units with training (TF) coded aircraft would determine report status using only the FSL and TNG columns. Units with multiple coded aircraft will ensure status is reported using the MESL columns appropriate to the individual aircraft/equipment assignment code or type mission being flown.

KC/KC/C-135B/C/E/R MINIMUM ESSENTIAL SUBSYSTEM LISTING (MESL)

NO.	WUC	SYSTEM/SUBSYSTEM	FSL	BSL		
				DTE	DTS	TNG
1.	11000	Airframe	X	X	X	X
2.	12000	Cockpit and Fuselage Compartments	X	X	X	X
3.	13000	Landing Gear	X	X	X	X
4.	13000	Landing Gear Position Indicators	X	X	X	X
5.	13000	Landing Gear Lock Alignment Stripes	X	X	X	X
6.	13000	Wheel Brakes	X	X	X	X
7.	13000	Anti-Skid System	X	X	X	X
8.	13000	Parking Brake	X	X	X	X
9.	13000	Landing Gear Handle Warning Light	X	X	X	X
10.	14000	Flight Controls	X	X	X	X
11.	14000	Warning Horn and Cutout Switch	X	X	X	X
12.	14000	Stabilizer Trim Control Switches	X	X6	X6	X6
13.	14000	Electric Trim Motor	X	X	X	X
14.	14000	Power Rudder System	X	X	X	X
15.	14000	Flap Position Indicators	X	X7	X7	X7
16.	14000	Spoiler Systems	X	X	X	X
17.	14000	Yaw Damper	X	X8	X8	X8
18.	14000	Yaw Damper Off Light	X	X		X

19.	14000	EFAS	X	X	X	X
20.	14000	SYD	X	X	X	X
21.	14000	Emergency System	X	X	X	X
22.	14000	Disengage Button	X	X20	X20	X20
23.	23000	Turbofan Propulsion System	X	X	X	X
24.	23000	Thrust Reversers	X	X34	X34	X34
25.	23000	Thrust Reverser Lights	X	X	X	X
26.	23000	Engine Ignition (A/B)	X	X1	X1	X1
27.	23000	EPR Gauges	X	X	X	X
28.	23000	Tachometer (N2)	X	X	X	X
29.	23000	EGT Gauges	X	X	X	X
30.	23000	Engine Fuel Flow Meter	X	X2	X2	X2
31.	23000	Oil Pressure, Temperature, and Quantity Gauges	X	X	X	X
32.	23000	Engine Low Oil Pressure Warning Lights	X	X	X	X
33.	23000	Engine Oil Filter Warning Lights	X	X	X	X
34.	23000	Engine Fire Detector System (All Engines)	X	X	X	X
35.	23000	Engine Fire and Overheat Detection and Extinguishing	X	X	X	X
36.	23000	PMC	X	X3	X3	X3
37.	23000	Auxiliary Power Unit (APU)	X	X4	X4	X4
38.	23000	Anti-Ice System	X	X	X	X
39.	23000	N1 Indicator Gauge	X	X	X	X
40.	23000	N2 Tach Indicator	X	X	X	X
41.	41000	Air Conditioning, Pressurization, and Bleed Air System	X	X	X	X
42.	41000	Air Conditioning Temperature Control Sys	X	X10	X10	X10
43.	41000	Cabin Pressure Control	X	X9	X9	X9
44.	41000	Cabin Pressure Warning Light	X	X	X	X
45.	41000	Cabin Altitude Gauge	X	X	X	X
46.	41000	Bleed Valves	X	X11	X11	X11
47.	41000	Bleed Air System Caution Lights	X	X	X	X
48.	41000	Vapor Cycle Units & Control	X	X	X	X
49.	41000	Wing Anti-Ice	X	X	X	X
50.	41000	Windshield Wiper System	X	X	X	X
51.	41000	Window Anti-Ice System	X	X	X	X
52.	41000	Boom Operator Heated Window	X	X20	X20	X20
53.	41000	Q Inlet Heat	X	X	X	X
54.	42000	Electrical System	X	X	X	X
55.	42000	AC Generator	X	X21	X21	X21
56.	42000	AC Generator Bus	X	X	X	X
57.	42000	Copilot Instrument Power	X	X	X	X
58.	42000	Bus Tie Breaker Light	X	X	X	X
59.	42000	Bus Subsystem Interface Unit (BSIU)	X	X	X	X
60.	42000	Generator Breaker Circuit Open Light	X	X	X	X

61.	42000	Generator Failure Light	X	X	X	X
62.	42000	Generator Drive Oil Temperature Rise Gauge	X	X	X	X
63.	42000	Generator Drive Oil Pressure Warning Light	X	X	X	X
64.	42000	Generator Auto Parallel	X	X	X	X
65.	42000	Generator Power Meter KW/KVAR	X	X	X	X
66.	42000	Synchronizing Lights	X	X	X	X
67.	42000	Battery Charging Ammeter	X	X	X	X
68.	42000	Transformer Rectifiers	X	X	X	X
69.	42000	DC Load Meter	X	X	X	X
70.	42000	DC Power Selector Ammeter Voltmeter Switch	X	X	X	X
71.	42000	Selector Paralleling Voltmeter Frequency Meter & Synchronizing Switch	X	X	X	X
72.	42000	Battery	X	X	X	X
73.	42000	Bus Tie Breaker Circuit Open Light	X	X	X	X
74.	42000	Generator Control Breaker Circuit Open Caution Light	X	X	X	X
75.	42000	IDG Fail Caution Light	X	X	X	X
76.	42000	IDG Disconnect Light	X	X	X	X
77.	42000	Generator Control Unit	X	X	X	X
78.	42000	Battery Load Meter	X	X	X	X
79.	42000	AC Volt Meter	X	X	X	X
80.	42000	AC Ammeter	X	X	X	X
81.	42000	DC Volt Meter	X	X	X	X
82.	42000	Frequency Meter	X	X	X	X
83.	42000	Switched DC Bus	X	X	X	X
84.	44000	Lights, Exterior	X	X	X	X
85.	44000	Position Lights	X	X23	X23	X23
86.	44000	Strobe Lights	X	X24	X24	X24
87.	44000	Landing Lights	X	X24	X24	X24
88.	44000	Taxi Lights	X	X25	X25	X25
89.	44000	Light, Interior	X	X	X	X
90.	44000	Door Warning Lights	X	X26	X26	X26
91.	44000	Overhead Panel Caution Light	X	X	X	X
92.	45000	Hydraulic Systems	X	X	X	X
93.	45000	Hydraulic Pumps	X	X	X	X
94.	45000	Auxiliary Pumps	X	X5	X5	X5
95.	45000	Hydraulic Quantity Gauge	X	X	X	X
96.	45000	Hydraulic Systems Pressure Gauges	X	X	X	X
97.	45000	Copilot Instrument Power Hydraulic Motor	X	X	X	X
98.	45000	Hydraulic Pump Inop Caution Lights	X	X	X	X
99.	46000	Fuel System	X	X	X	X
100.	46000	Boost Pumps	X	X	X	X
101.	46000	Override Pumps	X	X	X	X
102.	46000	Tank to Engine Manifold Valves	X	X12	X12	X12

103.	46000	Air Refueling	X	X	X	X
104.	46000	Air Refueling Manifold to Eng Manifold Valve	X	X	X	X
105.	46000	Center Wing to Forward Body Tank (Drain) Valves	X	X	X	X
106.	46000	Reserve Tank (Drain) Valves	X	X13	X13	X13
107.	46000	Upper Deck (Drain) Valve	X	X	X	X
108.	46000	Fuel Dump	X	X	X	X
109.	46000	Wing Aft Body Tank Valves	X	X	X	X
110.	46000	Air Refueling Line Valve	X	X	X	X
111.	46000	Air Refueling Pumps	X	X14	X14	X14
112.	46000	Air Refueling Pump Automatic Shutoff Sys	X	X35	X35	X35
113.	46000	Boom Sighting Door	X	X20	X20	X20
114.	46000	Boom Azimuth Indicator	X	X20	X20	X20
115.	46000	Boom Elevation Indicator	X	X20	X20	X20
116.	46000	Boom Signal Coil	X	X20	X20	X20
117.	46000	Boom Signal Amplifier	X	X20	X20	X20
118.	46000	Air Refueling Flood Light	X	X20	X20	X20
119.	46000	Air Refueling Nozzle Light	X	X20	X20	X20
120.	46000	Engine Manifold Fuel Low Pressure Warning Lights	X	X	X	X
121.	46000	Fuel Temperature Gauge	X	X	X	X
122.	46000	Total Fuel Quantity	X	X	X	X
123.	46000	Offload Fuel Flow Rate and Totalizer Gauge (w/o TCTO1131)	X	X	X	X
124.	46000	Main Tanks	X	X	X	X
125.	46000	Center Wing Tank	X	X	X	X
126.	46000	Reserve Tank	X	X	X	X
127.	46000	Forward Body Tank	X	X	X	X
128.	46000	Aft Body Tank	X	X	X	X
129.	46000	Upper Deck Tank	X36	X36	X36	X36
130.	46000	IFMP	X	X	X	X
131.	46000	CG Indicator (w/TCTO 1131)	X	X	X	X
132.	46000	Fuel Transfer Quantity Display	X	X	X	X
133.	46000	Fuel Transfer Rate Display (w/TCTO 1131)	X	X	X	X
134.	47000	Oxygen System	X	X17	X17	X17
135.	47000	Portable Oxygen Bottles	X	X18	X18	X18
136.	47000	Oxygen Regulators	X	X19	X19	X19
137.	49000	Fire Detection & Control	X	X	X	X
138.	51000	Instruments	X	X	X	X
139.	51000	Stall Warning System	X	X	X	X
140.	51000	Digital Flight Recorder	X	X	X	X
141.	51000	MACH Indicators	X	X	X	X
142.	51000	True Airspeed Indicator	X	X32	X32	X32
143.	51000	Indicated Airspeed Indicators	X	X	X	X

144.	51000	Vertical Velocity Indicators	X	X	X	X
145.	51000	Barometric Altimeters	X	X16	X16	X16
146.	51000	Radio Altimeters	X	X	X	X
147.	51000	Pitot Static and Heat System	X	X	X	X
148.	51000	Outside Air Temperature Gauge	X	X24	X24	X24
149.	51000	Total Air Temp System	X	X	X	X
150.	51000	Comparator Warning System	X	X	X	X
151.	51000	Angle of Attack	X	X24	X24	X24
152.	51000	Angle of Attack Transmitter Anti-Ice	X	X	X	X
153.	51000	Accelerometer	X	X	X	X
154.	51000	Attitude and Direction Indicator	X	X30	X30	X30
155.	51000	Flight Director/Rotation Go-Around System (FD/RGA)	X	X	X	X
156.	51000	Ground Proximity Warning System	X	X	X	X
157.	51000	MFDs	X	X27	X27	X27
158.	51000	Digital Air Data System	X	X33	X33	X33
159.	51000	Altitude Alerter	X	X33	X33	X33
160.	51000	DADC	X	X24, 33	X24, 33	X24,33
161.	51000	Flight Instrument Digital	X	X	X	X
152.	52000	Autopilot	X	X33	X33	X33
163..	52000	Disengage Button	X	X20	X20	X20
164	52000	Indicator, 3 Axis Trim	X	X	X	X
165.	52000	Yaw Control and Yaw Damper System	X	X	X	X
166.	57000	Inertial Navigation System	X	X	X	X
167.	57000	Data System	X	X	X	X
168.	57000	Data Loader (DLDR)	X	X	X	X
169.	57000	Magnetic Compass	X	X15	X15	X15
170.	57000	N-1 Compass	X	X29	X29	X29
171.	57000	J-4 Compass	X	X29	X29	X29
172.	57000	DNS	X	X	X	X
173.	57000	Instrument Landing System	X	X	X	X
174.	57000	RMI	X	X15, 29	X15, 29	X15,29
175.	57000	APN-59 Radar	X	X	X	X
176.	57000	Repeater Scope	X	X		
177.	57000	APN-69/APN-134 Beacon	X	X	X	X
178.	57000	APN-218	X	X	X	X
179.	57000	ASQ-15 Radar Pressure	X	X	X	X
180.	57000	Electronic Cabinet Cooling	X	X	X	X
181.	57000	Electronic Cabinet Cooling Overheat Light	X	X	X	X
182.	57000	Sextant	X	X	X	X
183.	57000	CDU-900B	X	X	X	X
184.	57000	INS CDU Warning Light	X	X	X	X
185.	57000	DNS CDU Warning Light	X	X	X	X
186.	57000	HSI	X	X30	X30	X30
187.	62000	ARC-210 Multi-Band Radio	X	X20	X20	X20

188.	62000	VHF Communications	X	X	X	X
189.	63000	UHF Communications	X	X22	X22	X22
190.	63000	HF Communications	X	X	X	X
191.	64000	Intercom Group/Interphone System	X	X	X	X
192.	64000	Comm Bus System Interface Unit (CBSIU)	X	X	X	X
193.	65000	IFF/SIF System	X	X33	X33	X33
194.	66000	Cockpit Voice Recorder System	X	X	X	X
195.	66B00	Flight Data Recorder	X	X	X	X
196.	68000	Digital Air Data Recorder	X	X	X	X
197.	71000	Radio Navigation (VOR/TACAN)	X	X	X	X
198.	72000	Low Range Radio Altimeter	X	X24	X24	X24
199.	72000	Color Weather Radar System	X	X31	X31	X31
200.	72000	WXR-700X Radar	X	X31	X31	X31
201.	72000	WCP-701 Radar Control Panel	X	X31	X31	X31
202.	72000	Predictive Wind Shear PWS	X	X31	X31	X31
203.	72000	Global Positioning System	X	X	X	X
204.	72000	Embedded GPS/INS (EGI)	X	X	X	X
205.	72000	INU -1 (EGI)	X	X	X	X
206.	72000	INU-2 (Carousel IV)	X	X	X	X
207.	72000	Radio Transponder System	X	X	X	X
208.	74000	IFF/SIF System	X	X	X	X
209.	74000	Vertical Gyro (SBU-23)	X	X	X	X
210.	74000	Standby ADI	X	X	X	X
211.	74000	Synchro Repeaters	X	X	X	X
212.	74000	1553 Data Bus	X	X	X	X
213.	74000	TCAS	X	X	X	X
214.	74000	Altitude Alerters	X	X	X	X
215.	91000	Emergency Equipment	X	X	X	X
216.	91000	Emergency Locator Transponder	X	X	X	X
217.	91000	Enhanced GPWS	X	X29	X29	X29
218.	91000	Emergency Alarm Horn	X	X	X	X
219.	91000	Fire Extinguishers	X	X	X	X
220.	91000	Escape Ropes	X	X	X	X
221.	96000	Personnel and Miscellaneous Equipment	X	X	X	X

QUALIFYING NOTES:

1. One igniter per engine must be operable.
2. One may be inoperative provided all other indicators for affected engine are operating normally.
3. (1) Refer to Aircraft Flight Manual, Section 1. (2) Simulated 3-engine approaches and touch and go landings are not authorized with PMC inoperative.
4. Ensure engine start capability exists at recovery site.
5. Left auxiliary pump must be operative.

6. The trim switch must operate for the pilot flying during critical phases of flight.
7. One may be inoperative on either flap gauge provided: (1) Flaps operate normally, (2) Verification of flap position can be made prior to take off and landing.
8. Must operate for long range cruise above FL 250.
9. (1) Automatic or manual mode must be operable. (2) Exception: Not required for unpressurized flight, see AFI 11-202, Volume 3 for requirements.
10. Automatic or manual mode must be operable.
11. (1) One may be inoperative on takeoff, but "R" model must have repair capability at next destination. (2) One may inoperative, but on "E" model the failure must fail to the closed position. Consider pressurization and temperature for sustained high altitude cruise.
12. One may be inoperative, but must fail to open position. Pull circuit breaker.
13. Valves not required to be operative if fuel is not needed for flight, and valves are verified closed.
14. (1) All must operate for extended over-water operations. (2) All must operate for gross weights which do not permit an immediate landing under normal flight manual landing parameters.
15. Only required if carrying passengers/troops.
16. Navigator's altimeter may be inoperative with no associated pitot static problems. Navigator's altimeter must be operable prior to operation in RVSM airspace on 55-3132 and 63-8050.
17. Primary system must be operable, minimum pressure 325 p.s.i.
18. One per primary crew member.
19. Each primary crewmember must have access to an operable regulator during flight.
20. Required for Air Refueling Missions.
21. (1) All must be operative except to avoid delays from airfields where maintenance is not adequate. (2) One time takeoff and flight is permitted with a disconnected generator drive to reach a field where repairs can be made. (3) With an inoperative generator (a) Do not use mission power without first coordinating electrical loads with the mission and flight crew. (b) Total flight and mission electrical loads shall not be allowed to exceed 50% of rated output for the number of generators operating. (c) All remaining generators must be paralleled and supply power to all generator buses.
22. As mission dictates. Comm 1 must operate.
23. Both wing tip lights and one tail light must be operative.
24. At least one must operate.
25. One taxi or terrain light must be operative for night operations.
26. Crew entry door and cargo door must be visually verified secured.

27. Sufficient at pilot or copilot position to monitor aircraft position, performance, and maintain aircraft control.
28. Initial position and date/time must be manually inserted into EGI.
29. Required if equipped.
30. N/A “Pacer Crag”
31. Required for thunderstorms or hazardous weather in the area of flight.
32. May be inoperative with no pitot static system problems.
33. Both DADC’s, all altimeters, autopilot altitude hold alerter and IFF/SIF, all must be operational for dispatch into RVSM airspace.
34. Inoperative Thrust Reversers must be locked-out. In addition, Symmetrical Engine Thrust Reverser must also be locked-out to maintain symmetrical thrust. i.e. Engine #1 and #4 or Engine #2 and #3 must be locked-out together.
35. Test Mission Dependent.
36. Does not apply to acft 61-00320—upper deck tank is deactivated due to water spray configuration.

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