

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



AIR FORCE INSTRUCTION 21-103

**AIR FORCE MATERIEL COMMAND
Supplement
ADDENDUM I**

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Maintenance

**EQUIPMENT INVENTORY, STATUS AND
UTILIZATION REPORTING SYSTEM/CV-22
MINIMUM ESSENTIAL SUBSYSTEM LIST
(MESL)**

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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.

CV-22 MINIMUM ESSENTIAL SUBSYSTEM LISTING (MESL)

NO.	UNS	SYSTEM/SUBSYSTEM	FSL	BSL		
				DTE	DTS	TNG
1.	21	Air Conditioning	X16	X	X	X
2.	211	SDC (Shaft Driven Compressor)	X3	X	X	X
3.	2120	Air Distribution	X3	X	X	X
4.	2151	Avionics Cooling	X	X	X	X
5.	2190	Integrated ECS	X14	X	X	X
6.	219002	ECU	X8	X	X	X
7.	219008	Emergency Vent Fan	X	X	X	X
8.	2400	Electrical Systems	X	X	X	X
9.	2420	AC Power System	X	X22	X22	X
10.	243004	DC Battery	X	X	X	X
11.	2440	External Power System	X	X21		
12.	25	EQPT and FURN	X16	X	X	X
13.	2520	Passenger Operator Crew Compartment	X	X	X	X
14.	252001	Crew Seat Assy	X	X	X	X
15.	152002	Jump Seat Assy	X	X21		
16.	252003	Troop Seats	X16	X21		
17.	2550	Internal Cargo Equipment	X1	X21		
18.	255001	Aircraft Mounted Cargo Winch	X1	X21		

19.	2560	Emergency Equipment	X9	X	X	X
20.	2590	Air Delivery System (2 ea Cables)	X	X21		
21.	2591	External Cargo System	X1	X21		
22.	259103	Cargo Hook, Aft	X	X21		
23.	2592	Rescue Hoist System	X13	X21		
24.	26	Fire Protection/Detection System	X	X	X	X
25.	27	Flight Controls	X	X	X	X
26.	2721/22/23	Flight Control Computers (3)	X	X	X	X
27.	272110110	AFCS/PFCS (3)	X	X	X	
28.	272102	Cockpit Interface Units (3)	X	X	X	X
29.	272119	FCC Battery Backup	X	X	X	X
30.	2724	Flight Control Sensing	X	X	X	X
31.	272402/3/4	Air Data/Pitot Static Equipment (3)	X	X	X	X
32.	272403	Pitot Static Probe (4)	X	X	X	X
33.	2810	Fuel Storage System	X7	X	X	X
34.	2820	Fuel Distribution	X	X	X	X
35.	2830	Fuel Dump	X	X	X	X
36.	2840	Fuel Indication System	X	X	X	X
37.	2850	In-Flight Refueling System	X16	X21		
38.	2861	Fuel Flow Monitoring	X	X	X	X
39.	2861201	Ground Refuel Defuel Panel	X	X	X	X
40.	2878	Cabin Aux Tank (1) (2)	X	X21		
41.	29	Hydraulics	X	X	X	X
42.	2925	Ramp Control System	X	X	X	X
43.	30	Ice & Rain Protection	X8	X21	X8	X8
44.	3042	Windshield Wiper System	X	X21		
45.	3080	Ice Detection Control	X8	X21	X8	X8
46.	3085	Ice Protection	X8	X21	X8	X8
47.	308505	Outside Air Temp Sensor (OAT)	X	X	X	X
48.	3110	Standby Instruments	X	X	X	X
49.	311006/7	Standby Compass Cockpit/Cabin	X	X	X	X
50.	311005	Flight Director Panel	X	X21		
51.	3131	Flt Incident Rcdr	X	X21		
52.	313101	Crash Survivable Memory Unit 4	X	X21		
53.	3132	VSLED Subsystem	X12	X	X	
54.	3210	Landing Gear	X6	X	X	X
55.	322025	NLG Hike Valve	X10	X,10,21	X,10,21	X10
56.	3240	Wheel Brakes System	X	X	X	X
57.	3250	Nose Wheel Steering System	X10,15	X21		
58.	326001	Gear Down Light	X10	X21		
59.	33	Lighting Systems	X4,5	X	X	X
60.	3310	Flight Compartment Lighting	X	X	X	X
61.	3340	External Lighting	X	X21	X	X
62.	334003	Anti-Collision Lighting	X	X	X	X
63.	334005/6	Ext Search Light (2)	X4	X	X	X

64.	334012	Formation/Position Lights	X	X	X	X
65.	3350	Emergency Exit Lighting	X	X	X	X
66.	3360	Lighting Control	X	X	X	X
67.	34	Nav System	X	X	X	X
68.	3411	RAD ALT AN/APN-194V	X	X21		
69.	3431	AN/ARN-147 Radio Set (VOR/ILS/MB)	X	X21		
70.	3451	TACAN	X	X21	X	X
71.	3421	Inertial Navigation System (LWINS) (3)	X18	X	X	X
72.	3452	GPS	X	X21		
73.	3455	IFF AN/APX-119-V3, Transponder Set	X19	X	X	X
74.	35	Oxygen System	X	X	X	X
75.	3540	O2/N2 Gas Generating System	X7	X7	X7	X7
76.	3541	O2 Emergency	X	X	X	X
77.	43	Comm System	X16,17	X	X	X
78.	4316	DCS-2000 Radio (VHF/UHF)	X16,17	X	X	X
79.	4361	Troop Commander Multi Band Ant	X	X21		
80.	4317	Interference Canceller	X	X21		
81.	4321	Troop Commander Hardware	X16	X21		
82.	43	Security, KY-58/TSEC (4 AT IOC)	X	X21		
83.	4391	SATCOM W/DAMA Modem (DCS 2000)	X	X21		
84.	4351	AN/AIC-XX Intercom SYSTEM	X	X	X	X
85.	9950	Multi-Mission Adv TAC Term (MATT)	X	X21		
86.	46	Systems Integration & Display	X	X	X	X
87.	4611	Mission Computers (2)	X	X	X	X
88.	4631	ANVIS HUD	X	X21		
89.	4910	Airborne Aux Power Unit (APU)	X	X	X	X
90.	5210	Passenger/Crew Doors	X1,11	X	X	X
91.	5230	Cargo Door	X20	X	X	X
92.	5232	Ramp	X1,20	X	X	X
93.	5250	Cockpit/Crew Cabin Doors	X	X21		
94.	5280	Landing Gear Doors	X11	X	X	X
95.	5780	Wing Stow System	X10,16	X21		
96.	6325	Rotor Brake	X10	X21		
97.	66	Blade Fold System	X10,16	X21		
98.	7180/81	EAPS (2)	X2	X	X	X
99.	7850	Engine Air Exhaust (LH/RH) (IRS)	X	X	X	X
100.	7851	COANDA Deflector	X	X	X	X
101.	93	Surveillance System	X	X21		
102.	9342	AN/AAR-47 IR Missile Warning	X	X21		
103.	9351	FLIR	X	X21		
104.	935103	Multi-Function Track Handle	X	X	X	X
105.	93	EICAS Control Unit	X	X21		
106.	9371	MMR	X	X21		
107.	9520	Escape Hatches	X	X21		X
108.	95200	Explosives CAD, PAD, Det Cord Etc	X	X	X	X

109.	9910	AN/ALQ-211 (V) (Sirfc)	X	X21		
110.	991008	Dedicated EW Display	X	X21		
111.	9913	DIRCM	X	X21		
112.	9931	AN/ALE-47 Chaff/Flare Dispenser Set	X	X21		

QUALIFYING NOTES:

1. Internal/External Cargo Loading System/Equipment required for internal/external cargo transportation missions.
2. EAPS is required for operations on unimproved surfaces and icing conditions.
3. SDC is required for ECS operation and operations on unimproved surfaces.
4. Only the top beacon is required for flight. 1 EA searchlight is required.
5. Night missions require fully functional cockpit lighting. Lighting control must operate through NVG (lowest) range.
6. A/C is NMC flyable. Landing gear may be inop provided they can be pinned down and airspeed remains below 140 knot.
7. AC fuel system is not N2 inerted if N2 distribution or generation is inoperative. Emergency O2 required for smoke/fume elimination. If mission requirements permit, the aircraft may be flown with O2 Gas Generating System inoperative.
8. Required in potential icing conditions.
9. Basic emergency equipment listing includes-- 2EA hand held fire extinguishers & 1EA first aid kit.
10. Shipboard operations. Blade/Wingstow locked/Flight Ready. Brakes/Parking brakes must be operational. Hike valve required for towing.
11. Nacelle angle limited to greater to or = to 45deg if upper cabin door can't close. Airspeed limit with gear extended is 150 Knots. Landing gear cannot be extended or retracted above 140 knots. There is no authorization to fly with landing gear doors removed.
12. Not required for flight, but engine vibration exceedance not reported when VLSED inoperative. Power by Hour penalty cost factors apply.
13. Rescue hoist required for over water ops, AIEs and CSAR.
14. Effects on crew/passenger can be negatively impacted (Less than 32 deg (F) and Hot (greater than 95 deg (f)).
15. Required for STOL operations.
16. Based on mission requirements.
17. One radio must be operational.
18. Two INS must be operational.

19. IFF mode 3 must be operational. Mode 1, 2, 4 must be operational for combat missions.
20. Cargo Door and Ramp must be closed for Aerial refueling.
21. May be required by specific test mission.
22. Flight with one VFG inoperative authorized provided: specific test requirements allow aircraft not to be flown in icing conditions, confirm proper operation of PMG prior to each flight, and the condition is corrected within 35 flight hours.

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