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**AIR AND SPACE EQUIPMENT
STRUCTURAL MAINTENANCE**

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This instruction provides procedural guidance to establish and support the Corrosion Prevention and Control, Non Destructive Inspection (NDI) and Advanced Composites maintenance programs. It implements policy in AFD 21-1, *Air and Space Maintenance*. This instruction applies to all major commands (MAJCOMs), the Air National Guard (ANG), Air Reserve Components (ARC) and their subordinates. HQ USAF/ILM is the waiver authority for this instruction and the approval authority for supplements. MAJCOMs developing separate instructions based on requirements set forth in this instruction will follow guidance in AFI 33-360, *Publication Management Program*. Ensure all records created by this publication are maintained and disposed of IAW AFMAN 37-139, *Records Disposition Schedule*.

(ANG) Air Force Instruction (AFI) 21-105, *Air and Space Equipment Structural Maintenance*, 9 April 2003 and AFI 21-124, *Air Force Oil Analysis Program* 4 April 2003, is supplemented as follows. This supplement has been approved by Headquarters, United States Air Force, Directorate of Maintenance/Maintenance Management Division (HQ USAF/A4LM). Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF Form 847, *Recommendation for Change of Publication*; This

instruction establishes objectives, and assigns responsibilities for implementing and maintaining an effective Corrosion Prevention and Control Program, Nondestructive Inspection Program (NDI), and Oil Analysis Program (OAP), and Low Observables (LO) on Air Force systems, equipment, and components in the Air National Guard. NGB/A4MM is the office of primary responsibility (OPR) for requests for deviations or waivers from the requirements of this instruction. This publication is applicable to all ANG units and takes precedence over Gaining Command Corrosion Instructions. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual (AFMAN) 33-363, *Management of Records*, and disposed of in accordance with Air Force Records Information Management System (AFRIMS) Records Disposition Schedule (RDS) located at <https://www.my.af.mil/gcss-af61a/afirms/afirms/>.

SUMMARY OF CHANGES

This document is substantially revised and must be completely reviewed.

(ANG) This publication is a revision of ANGI 21-105, *Corrosion Control, Nondestructive Inspection, and Oil Analysis Programs*, 1 February 2007 and defines and incorporates changes in corrosion prevention and control, low observables, aircraft washing, corrosion training, maintenance painting, and aircraft markings. This publication incorporates the following revisions: paragraphs 4.1.2., 4.4.6.1., 4.4.6.2., 6.1., 6.4., 7.2., Unit Oil Analysis Program (paragraph 11.4.2. through 11.5.9.); ANG Aircraft Markings (Attachment 6); Typical ANG Tail Configurations (Attachment 7). This publication provides the principles, policies, and objectives required for the ANG Nondestructive Inspections and Oil Analysis Program.

1.	Objectives.	3
2.	Programs.	3
3.	Roles and Responsibilities.	3
4.	(Added-ANG) WING CORROSION CONTROL PROGRAM	13
5.	(Added-ANG) General Corrosion Prevention and Control.	18
6.	(Added-ANG) Washing Aircraft.	19
7.	(Added-ANG) Corrosion Prevention and Control Training.	19
8.	(Added-ANG) Maintenance Painting	20
9.	(Added-ANG) AIRCRAFT MARKINGS	20
10.	(Added-ANG) Unit Nondestructive Inspection Program	20
11.	(Added-ANG) Unit Oil Analysis Program (OAP) (When applicable)	21
12.	(Added-ANG) Local Supplements	24
Attachment 1—GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION		26
Attachment 2—(Added-ANG) AIRCRAFT POST WASH CORROSION INSPECTION		31
Attachment 3—(Added-ANG) AIRCRAFT POST-WASH CLEANLINESS INSPECTION		34

Attachment 4—(Added-ANG) AIRCRAFT PRE-WASH SUPERVISOR’S GUIDE	37
Attachment 5—(Added-ANG) SUPERVISOR’S SAFETY BRIEFING	38
Attachment 6—(Added-ANG) ANG AIRCRAFT MARKINGS	39
Attachment 7—(Added-ANG) TYPICAL ANG TAIL MARKING CONFIGURATIONS	55

1. Objectives. This guidance addresses responsibilities to maintain air and space equipment in the optimum condition. An effective structural maintenance program is crucial to support short-term readiness objectives while maintaining fleet health for long-term capability.

- 1.1. Policies shall be established and reviewed to mandate structural maintenance programs.
- 1.2. Air Force organizations shall be structured to optimize structural maintenance programs.
- 1.3. Preventative maintenance programs shall be emphasized to ensure the safety and operability of Air Force systems and equipment.
- 1.4. Roles and responsibilities for structural maintenance shall be specified to ensure compliance and accountability.

2. Programs. The Air Force will provide optimum support to structural maintenance programs to maintain air and space equipment in a safe, serviceable and ready condition. This guidance addresses three key structural maintenance programs: NDI, Advanced Composites and Corrosion Prevention and Control. The programs support all functions that acquire, modify, or maintain air and space systems.

- 2.1. NDI. The NDI Program assesses the structural integrity of air and space systems and equipment by detecting defects (i.e., cracks, voids), delaminations, and foreign objects, and measuring properties such as material thickness, bond-line integrity, material composition and corrosion.
- 2.2. Advanced Composites. The Advanced Composites Program addresses repair and supportability issues for air and space systems containing advanced composite materials.
- 2.3. Corrosion Prevention and Control. The Corrosion Prevention and Control Program ensures structural integrity of air and space systems and supporting equipment by preventing, assessing, detecting and controlling the damage and effects of corrosion.

3. Roles and Responsibilities.

3.1. Headquarters Air Force (HAF). The Directorate of Maintenance (AF/ILM) is the chief HAF agency with responsibility for structural maintenance guidance.

- 3.1.1. Prepares, publishes and reviews AF-level policy and guidance, including this publication. This publication should be reviewed annually and revised, as necessary.
- 3.1.2. Conducts an annual program management review with functional managers to enhance structural maintenance program effectiveness.
- 3.1.3. Conducts Utilization and Training Workshops (U&TW) at least every 3 years to resolve technical and training issues for structural maintenance programs.

3.1.4. Establishes procedures for coordinating and establishing names/titles of aircraft or equipment.

3.1.5. Maintains and distributes a list of focal points and functional experts for structural maintenance programs.

3.2. Major Commands (MAJCOM). MAJCOMs provide manpower, resources and training consistent with the assigned mission. Provide detailed guidance, funding and analysis to optimize readiness.

3.2.1. Assign command manager(s) for NDI, Advanced Composites, and Corrosion Prevention and Control functional programs.

3.2.1. **(ANG)** NGB/A4MM is the command manager for NDI, Advanced Composites, and Corrosion Prevention and Control functional programs.

3.2.2. Participate in discipline and system-specific advisory boards, conferences, and applicable U&TWs.

3.2.3. Provide timely review of weapon system-specific (to single managers) and general series (to sustainment offices) technical data changes.

3.2.4. Coordinate field-level Subject Matter Expert (SME) support for T.O. change validation/verification processes as requested by Air Logistics Centers (ALCs).

3.2.5. Advocate and participate in periodic command-specific surveys and base assessments in the NDI, advanced composites, and corrosion prevention and control disciplines.

3.2.6. Support AFRL/MLSS field-testing of materials, processes, equipment, and probability of detection (POD) studies prior to operational implementation. Advocate unit-level participation in field test programs when necessary.

3.2.7. Coordinate requests for naming aircraft through appropriate MAJCOM/CC and forward to HQ USAF/ILMM for coordination and approval by AF/CV.

3.2.8. **(Added-ANG)** Command Functional Manager (NGB/A4MM) Responsibilities:

3.2.8.1. **(Added-ANG)** Represents the Command and supports the Corrosion Prevention Advisory Board (CPAB), Advance Composite & LO Working Group/Maintainer, NDI & Metals Technology meetings for the assigned weapons systems.

3.2.8.2. **(Added-ANG)** validates that a SPOC per weapon system to represent the program manager in these disciplines at the various meetings is appointed IAW AFI 21-101_ANGSup, Chapter 19

3.2.8.3. **(Added-ANG)** Encourages Corrosion, Advance Composite, LO, NDI, and Metal Tech support from field units.

3.2.8.4. **(Added-ANG)** Ensures that adequate technical training is available for Aircraft Structural Maintenance (ASM) personnel in AFSC 2A7X3 and Low Observable Aircraft Structural Maintenance (LOASM) personnel in AFSC 2A7X5.

- 3.2.8.5. **(Added-ANG)** Supports and provides technical expertise for Utilization and Training Workshops to ensure that training requirements are current.
- 3.2.8.6. **(Added-ANG)** Coordinates training requirements with Air Education and Training Command (AETC) to facilitate course scheduling/attendance.
- 3.2.8.7. **(Added-ANG)** Stresses the importance of an effective Corrosion Control for the Command, and assists subordinate units in developing effective training programs.
- 3.2.8.8. **(Added-ANG)** Advocates the importance of communication between Unit Corrosion Managers and weapon system SPOCs.
- 3.2.8.9. **(Added-ANG)** Coordinates with Air Force Materials Command (AFMC) in the development and testing of new and improved materials, processes, and equipment.
- 3.2.8.10. **(Added-ANG)** Coordinates and supports the Air Force Corrosion Program Office (AFCPO) by participating in field surveys, DOD and AF Corrosion Manager Meetings, Corrosion Advisory Boards, and equipment evaluations.
- 3.2.8.11. **(Added-ANG)** validates that a SPOC to serve as a central coordinator for all ANG NDI Laboratories is appointed IAW AFI 21-101_ANGSup, Chapter 19
- 3.2.8.12. **(Added-ANG)** Represents NGB/A4M at DOD/Air Force NDI/OAP conferences and meetings.
- 3.2.8.13. **(Added-ANG)** Conduct periodic Command NDI meetings and provide equipment and NDI program status briefings.
- 3.2.8.14. **(Added-ANG)** Ensures adequate technical training is current and available for NDI/OAP Program.
- 3.2.8.15. **(Added-ANG)** Identify training requirements to the AETC to facilitate course scheduling/attendance for NDI/OAP Program.
- 3.2.8.16. **(Added-ANG)** Supports the Air Force NDI/OAP Program Office by participating in NDI/OAP equipment evaluations, field evaluations, NDI/OAP Integrated Process Teams, NDI/OAP Product Improvement Teams, NDI/OAP Managers meetings, and advisory boards.
- 3.2.8.17. **(Added-ANG)** Ensures the allocation and distribution of NDI/OAP resources to meet ANG mission requirements.
- 3.3. Air Force Materiel Command (AFMC). AFMC is the lead MAJCOM with responsibility for the NDI, Advanced Composites and Corrosion Prevention and Control programs. AFMC will provide adequate logistics and research, development, test and evaluation to support MAJCOMs.
- 3.3.1. Provide program funding and sponsor senior-level review and approval boards.
- 3.3.2. Coordinate with AFRL/MLSS to ensure proper representation in all forums that impact technical or financial management of the sustainment offices.

3.3.3. Air Logistics Centers (ALCs). Each of the ALCs plays a crucial role in the NDI, Advanced Composites and Corrosion Prevention and Control programs. ALCs must specifically designate roles and responsibilities for program support.

3.3.3.1. Appoint a manager to execute the ALC NDI Program.

3.3.3.1.1. Ensure all new or modified NDI procedures are verified by performance before T.O. change publication and distribution IAW T.O. and AF guidance.

3.3.3.1.2. Coordinate field-level SME support for T.O. change validation/verification processes with the appropriate MAJCOM functional manager.

3.3.3.1.3. Review and approve training and proficiency requirements for ALC NDI personnel.

3.3.3.1.4. Ensure organizational and intermediate level personnel are sufficiently trained on new equipment and procedures before implementation.

3.3.3.1.5. Notify single managers of changes to centrally procured equipment and recommend appropriate changes to weapon system-specific and commodity T.O.s.

3.3.3.1.6. Review and coordinate on all changes to NDI facilities, equipment, materials, and processes at the ALC when they impact inspection capability or sensitivity, or change parameters outside specific technical order limits.

3.3.3.1.7. Participate in NDI Advisory Boards, NDI Integrated Process Teams (IPTs), and AF NDI Managers Working Groups as needed to support the resolution of field and depot related issues. Ensure representatives from the affected weapon system and product directorate also participate.

3.3.3.1.8. Review and coordinate on all NDI procedures/changes submitted for field use in accordance with published guidelines, including (but not limited to) Time Compliance TOs and Interim Operating Supplements.

3.3.3.1.9. Maintain qualification/certification program. Refer to AFMCI 21-108, *Maintenance Training and Production Acceptance Certification (PAC) Program*.

3.3.3.2. Appoint a manager to execute the ALC Advanced Composites Program.

3.3.3.2.1. Develop, review, and approve training and proficiency requirements for ALC advanced composites repair personnel. Must include evaluations of proficiency with methods, equipment, and experience.

3.3.3.2.2. Consult the AF Advanced Composites Office when determining advanced composites training, procedures, and equipment requirements.

3.3.3.2.3. Review all major changes to weapon system-specific advanced composite repair T.O.s and other technical data, upon request of the weapon system single manager or MAJCOM functional manager.

3.3.3.2.4. Review and coordinate on all changes to ALC advanced composite facilities, equipment, materials, and processes when they have potential to

adversely impact repair capabilities at any level of maintenance.

3.3.3.2.5. Provide single managers with engineering and technical support for design, redesign and analysis of advanced composite repair processes.

3.3.3.2.6. Establish a “clearing house” for composite materials utilized during manufacture and overhaul processes to minimize waste and maximize material usage.

3.3.3.2.7. Provide ALC composite materials clearinghouse with engineering support to ensure weapon system single managers’ requirements are met.

3.3.3.2.8. Provide engineering support to laboratories performing material recertification processes.

3.3.3.2.9. Ensure representatives from the affected weapon system and product directorate participate in advanced composite repair advisory boards, IPTs, and conferences as needed to support the resolution of field and depot related issues.

3.3.3.3. Designate a manager to execute the ALC Corrosion Prevention and Control Program.

3.3.3.3.1. Inform the AF Corrosion Prevention and Control Office when determining corrosion abatement material and process needs based on weapon system and ALC requirements.

3.3.3.3.2. Assist the AF Corrosion Prevention and Control Office during technology evaluations of corrosion–related materials, equipment, and processes.

3.3.3.3.3. Review major changes to weapon system-specific corrosion prevention and control technical data upon request of single managers or MAJCOM functional managers.

3.3.3.3.4. Review and coordinate on significant changes to corrosion prevention and control facilities, equipment, materials, and processes used at the ALC.

3.3.3.3.5. Participate in Corrosion Prevention Advisory Boards (CPABs) for weapon systems managed or maintained at the ALC, and support resolution of field and depot related corrosion issues through attendance at corrosion-related IPTs, conferences, and other working groups.

3.3.3.3.6. Ensure the ALC workforce is adequately trained in corrosion prevention and control processes.

3.3.4. Air Force Research Laboratory (AFRL). AFRL plans/executes all aspects of the AF Science & Technology Program and is the key organization with functional expertise and responsibility for the AF structural maintenance programs. AFRL establishes and maintains the Air Force NDI, Advanced Composites, and Corrosion Prevention and Control sustainment offices within the Materials and Manufacturing Directorate (AFRL/ML). These offices serve as the primary customer support function working cross-cutting technologies and solutions for the Major Commands (MAJCOMs), and the depot, intermediate, and organizational levels of maintenance throughout the Air Force.

- 3.3.4.1. Establish policies for management and continuity of the AF NDI, Advanced Composites and Corrosion Prevention and Control programs. This includes all functions from basic research through field implementation.
- 3.3.4.2. Ensure Research, Development, Test and Evaluation (RDT&E) is conducted to develop, improve, and validate NDI methods and equipment for the detection and quantification of structural flaws.
- 3.3.4.3. Ensure RDT&E is conducted to improve and validate advanced composite repair techniques including contingency repairs, large area defects, and Low Observable (LO) composite repairs.
- 3.3.4.4. Ensure RDT&E is conducted to screen, evaluate, qualify, and approve new materials, processes, and equipment for detecting, identifying, preventing, and controlling corrosion.
- 3.3.4.5. Assemble and maintain a cadre of engineering and technical experts in NDI, advanced composites, and corrosion prevention and control. These experts must be readily accessible and responsive to MAJCOMs, ALCs and field maintenance activities.
- 3.3.4.6. Promote integrated solutions to sustainment issues by conducting periodic meetings, participating in integrated product teams, and attending other forums to cross flow NDI, advanced composites, and corrosion prevention and control information.
- 3.3.4.7. Establish a process to review research and development (R&D) programs to ensure they meet user needs in the NDI, advanced composites and corrosion prevention and control areas.
- 3.3.4.8. Develop, draft and coordinate discipline-specific policies and procedures on behalf of USAF/ILMM and AFRL/ML.
- 3.3.4.9. Ensure material and process technologies have been sufficiently field-tested prior to field implementation and technical order incorporation through coordination with system program offices and MAJCOMs.
- 3.3.4.10. Participate in system acquisition reviews and present sustainment-related recommendations to cognizant authorities during design, prototyping and initial fielding of new air and space systems.
- 3.3.4.11. Support MAJCOM, ALC and single manager requests for field tests, command/agency surveys, resolution of materials-related difficulties, and in-service equipment problems.
- 3.3.4.12. Serve as the central information warehouse for discipline-specific qualified products, processes, equipment, and general series technical data.
- 3.3.4.13. Conduct and participate in discipline-specific technology exchange forums and joint sustainment activities with other DoD components, government agencies and civilian industry.

- 3.3.4.14. Participate in annual program management reviews with USAF/ILMM, the 2A7XX MAJCOM functional managers, and AFRL/MLSS to assess and enhance program effectiveness.
- 3.3.4.15. Develop standardized guidelines for discipline-specific advisory board charters. These guidelines will address constituency, roles, and procedures.
- 3.3.4.16. Develop and publish pertinent information and promotional materials needed to manage the AF NDI, Advanced Composites, and Corrosion Prevention and Control maintenance programs.
- 3.3.4.17. Participate in applicable U&TWs as an SME in the respective discipline or functional area.
- 3.3.5. Single Managers. The single managers are crucial to the success of the AF structural maintenance programs, for they manage every aspect of their respective weapon systems.
- 3.3.5.1. Ensure NDI requirements are documented and validated by Aircraft Structural Integrity Program (ASIP) and Engine Structural Integrity Program (ENSIP).
- 3.3.5.2. Establish and maintain weapon system requirements for facilities, tooling, and equipment, including master NDI reference standards.
- 3.3.5.3. Ensure system-specific NDI requirements are reviewed and approved by ALC NDI engineering staff.
- 3.3.5.4. Ensure field NDI SMEs and ALC managers support and verify all new or modified NDI procedures before they are published and distributed.
- 3.3.5.5. Coordinate field-level SME support for T.O. change validation/verification processes as with the appropriate MAJCOM functional manager.
- 3.3.5.6. Ensure specialized weapon system/item NDI training is provided to maintenance personnel for unique NDI procedures on their weapons systems.
- 3.3.5.7. Ensure that NDI procedures are developed, validated, and incorporated into weapon system-specific technical data. Any such procedures submitted for field use must be reviewed and approved by the ALC NDI Manager.
- 3.3.5.8. Evaluate the impact of probability of detection (POD) results on inspection intervals. Forward findings to the AF NDI Office.
- 3.3.5.9. Maintain NDI technical order currency (i.e., plan for NDI technical order updates and changes especially when new centrally procured equipment is scheduled for purchase).
- 3.3.5.10. Establish a charter to govern the NDI Advisory Boards (NDIAB) for resolving system-specific issues and action items. The single manager, serving as Chair, conducts the NDIAB periodically.
- 3.3.5.11. Participate in NDI IPTs and working groups as needed to maintain continuity throughout the Air Force.

- 3.3.5.12. Identify ALC equipment needs to the AF NDI Office.
- 3.3.5.13. Identify new NDI field inspection equipment technical requirements to the AF NDI Office for incorporation into equipment commercial item descriptions.
- 3.3.5.14. Provide to the AF NDI Office, when requested, all currently collected cost and manpower investment data needed to assess total cost of NDI inspections for their weapon system.
- 3.3.5.15. Ensure system-specific required advanced composites training is defined and documented for personnel at all levels of maintenance, including contractors.
- 3.3.5.16. Ensure that advanced composites procedures are developed, validated, and incorporated into weapon system-specific technical data. Any such procedures submitted for field use must be reviewed and approved by the ALC Advanced Composites Manager.
- 3.3.5.17. Maintain advanced composites T.O. currency for their respective weapon system.
- 3.3.5.18. Establish and maintain minimum weapon system-specific requirements for facilities, tooling, and equipment.
- 3.3.5.19. Ensure composite repair materials are available to field maintenance units in reasonable quantities and cost.
- 3.3.5.20. Ensure hazardous material handlers and mishap recovery personnel receive material handling training in conjunction with system-specific training.
- 3.3.5.21. Provide the AF Advanced Composites Office all currently collected cost and manpower investment data needed to assess total cost of advanced composite maintenance/repair/manufacture for their weapon system upon request.
- 3.3.5.22. Establish a charter to govern Corrosion Prevention Advisory Boards (CPABs), IPTs and AF composite repair groups and conferences to support the resolution of field and depot related issues. Chair and conduct CPAB meetings at least annually.
- 3.3.5.23. Develop and maintain up-to-date engineering and technical data for corrosion-related materials and processes, paint schemes, and system-specific markings for their weapon systems.
- 3.3.5.24. Participate in corrosion-related conferences, IPTs, and other working groups as needed to maintain connectivity with DoD, industry, and Air Force corrosion maintenance and engineering personnel.
- 3.3.5.25. Ensure that system-specific specialized and supplemental corrosion prevention and control training is available for personnel at all levels of maintenance.
- 3.3.5.26. Establish and maintain weapon system-specific requirements for facilities, tooling, and equipment.
- 3.3.5.27. Provide to the AF Corrosion Prevention and Control Office, when requested, all currently collected cost and manpower investment data needed to assess total cost of corrosion maintenance for their weapon system.

- 3.3.5.28. Ensure corrosion is adequately addressed in weapon system integrity plans (Force Structure Maintenance Plan, Weapon System Capability Plan).
- 3.3.6. AF NDI Office. This office, assigned to AFRL (AFRL/MLSST), serves as the focal point for the AF NDI maintenance program. The AF NDI Office guides the maintenance support program for HQ USAF by overseeing NDI-related activities throughout the Air Force and providing technical support to users.
- 3.3.6.1. Provide engineering assistance and technical consultation to USAF/ILMM, MAJCOMs, ALCs, single managers and field maintenance personnel.
- 3.3.6.2. Support ALC NDI managers and single managers during review of technical data revisions.
- 3.3.6.3. Conduct POD studies and forward results to single managers and ALC managers.
- 3.3.6.4. Conduct an Air Force-wide conference to cross flow/resolve NDI issues with Air Force structural maintenance and ALC personnel.
- 3.3.6.4.1. Conduct an Air Force NDI Manager's Working Group.
- 3.3.6.4.2. Participate in and provide technical and engineering support to all NDI Advisory Boards. Assist weapon system single managers, MAJCOM functional managers, and ALC NDI managers in tracking, researching and resolving action items.
- 3.3.6.5. Establish NDI technical equipment requirements with the assistance/coordination of the ALCs. Evaluate new equipment before procurement to ensure adequate field-testing is accomplished prior to its acquisition and to ensure equipment meets AF requirements for safety, deployability, sensitivity, repeatability, reliability, and maintainability.
- 3.3.6.6. Accomplish assessments of all organizational, intermediate, and depot level NDI laboratories at the request of the MAJCOM functional manager or at least every 5 years.
- 3.3.6.7. Manage Technical Order 33B-1-1, NDI Methods, to ensure its accuracy, currency and timely publication.
- 3.3.6.8. Provide sole engineering support for acquisition, repair, and maintainability of centrally procured equipment, and be the engineering authority for centrally procured equipment to promote standardization and prevent and eliminate proliferation of NDI equipment.
- 3.3.6.9. Develop and maintain an NDI equipment strategic master plan. Master plan must be coordinated with MAJCOM NDI managers, ALC NDI managers, and item management POCs.
- 3.3.7. AF Advanced Composites Office. This office, assigned to AFRL (AFRL/MLSSH), serves as the focal point for the AF Advanced Composites maintenance program. The AF Advanced Composites Office guides the maintenance support program for HQ USAF by overseeing composites-related maintenance and design activities throughout the Air Force and providing technical support to users.

3.3.7.1. Provide engineering technical support for design, redesign and analysis of composite repair to the MAJCOMs, ALCs, single managers and field maintenance personnel upon request.

3.3.7.2. Assist ALC, MAJCOM, and AFRL NDI and corrosion managers during development of methods, equipment, and technical data to detect defects and prevent corrosion in advanced composite structures.

3.3.7.3. Support the ALCs and single managers in the review of all new and major revisions to technical data.

3.3.7.4. Provide technical data/information to support advanced composites training at all levels of maintenance. Conduct assistance visits as requested by the AETC AFSC 2A7X3 technical school, ALC training functions, and other training units. Provide specialized training assistance that is otherwise unavailable.

3.3.7.5. Develop and publish minimum facility, tooling, and equipment guidelines for generic advanced composites supportability processes.

3.3.7.6. Research, coordinate, and publish mishap guidelines for the safe handling of advanced composites materials.

3.3.7.7. Manage Technical Order 1-1-690, *General Advanced Composite Repair Processes Manual*, to ensure its publication, accuracy, and currency.

3.3.7.8. Assist the single manager, Aircraft Battle Damage Repair (ABDR) Program Office, and MAJCOMs in supporting deployable rapid-repair capability for advanced composite structures.

3.3.7.9. Conduct assistance visits to identify and resolve advanced composites repair-related issues upon request of MAJCOM, ALC or field maintenance personnel.

3.3.7.10. Assess the viability of emerging composite repair technologies and assist with transition of new technologies to new and existing weapon systems.

3.3.7.11. Conduct a DoD-wide conference to cross flow/resolve composites repair issues. This forum will include Air Force structural maintenance personnel at the organizational, intermediate, and depot levels of maintenance, as well as other DoD and industry composite design and repair personnel.

3.3.7.12. Participate in and provide technical engineering support to all Advanced Composite Advisory Boards, IPTs and AF composite supportability groups. Assist weapon system single managers, MAJCOM functional managers and ALC NDI managers in tracking, researching and resolving action items.

3.3.8. AF Corrosion Prevention and Control Office (CPCO). This office, assigned to AFRL (AFRL/MLSSR), serves as the focal point for the AF Corrosion Prevention and Control maintenance program. The AF CPCO guides the maintenance support program by overseeing corrosion maintenance-related activities throughout the Air Force and providing technical support to users.

3.3.8.1. Provide engineering and technical assistance to MAJCOMs, ALCs, single managers, and field maintenance personnel.

- 3.3.8.2. Survey MAJCOM corrosion prevention and control operations/programs at the request of MAJCOM functional manager, or at least once every 5 years.
- 3.3.8.3. Perform technical and engineering site assistance visits to address specific field, ALC, single manager, and MAJCOM concerns upon request.
- 3.3.8.4. Conduct an Air Force-wide conference to cross flow/resolve corrosion prevention and control issues with Air Force structural maintenance and ALC personnel.
- 3.3.8.5. Support ALC managers and single managers during the review of new and major revisions to technical data as requested by the appropriate single manager.
- 3.3.8.6. Provide technical information and assistance to support corrosion prevention and control training at all levels of maintenance, and review changes to AF formal corrosion training curricula.
- 3.3.8.7. Review and validate master facilities requirements documents. Develop and document minimum facility requirements for corrosion maintenance at all levels of maintenance.
- 3.3.8.8. Provide cognizant engineering support for: T.O. 1-1-8, *Application and Removal of Organic Coatings, Air and Space and Non-Air and Space Equipment*; T.O. 1-1-686, *Desert Storage Preservation and Process Manual For Aircraft, Aircraft Engines, and Aircraft Auxiliary Power Unit Engines*; T.O. 1-1-689, *Avionics Cleaning and Corrosion Prevention/Control*, T.O. 1-1-691, *Aircraft Weapon Systems Cleaning and Corrosion Control*; T.O. 36-1-191, *Technical And Managerial Reference For Motor Vehicle Maintenance*; T.O. 35-1-3, *Corrosion Prevention, Painting and Marking of USAF Support Equipment*; T.O. 35-1-4, *Processing and Inspection of Support Equipment for Storage and Shipment*; and T.O. 35-1-12, *Compounds and Procedures For Cleaning Support Equipment*.
- 3.3.8.9. Participate in and provide technical and engineering support to all CPABs. Assist weapon system single managers, MAJCOM functional managers, and ALC corrosion managers in tracking, researching, and resolving action items.
- 3.3.8.10. Conduct weapon system surveys as requested by the single manager or as stated in the CPAB charter.
- 3.3.8.11. Coordinate with environmental, safety, and occupational health OPRs to assist users in meeting applicable ESOH requirements.
- 3.3.8.12. Conduct a USAF-wide Cost of Corrosion Maintenance Study at least every 5 years, in support of corrosion management and technology development efforts.

4. (Added-ANG) WING CORROSION CONTROL PROGRAM

4.1. (Added-ANG) Maintenance Group Commander Responsibilities

- 4.1.1. **(Added-ANG)** Ensures the Wing has an effective Corrosion Prevention and Control Program.
- 4.1.2. **(Added-ANG)** Publishes Local Supplements to this instruction IAW AFI 33-360 establishing wing policy and procedures for the following:

4.1.3. **(Added-ANG)** Appoint a highly qualified NCO with appropriate technical background and corrosion control experience to serve as the Wing Corrosion Prevention and Control Manager.

4.1.4. **(Added-ANG)** Ensure that a corrosion-training program is established.

4.1.4.1. **(Added-ANG)** Ensure all personnel involved in aircraft maintenance receive corrosion control (initial and refresher) training, and meet safety and health requirements, as set forth under the Occupational Safety and Health Administration (OSHA).

4.1.5. **(Added-ANG)** Establish procedures for periodic cleaning of aircraft and support equipment, IAW applicable publications.

4.1.6. **(Added-ANG)** Ensure that the Wing Corrosion Manager participates in Command and Weapon System Corrosion Prevention and Control Programs.

4.1.7. **(Added-ANG)** Ensure that funding for facilities, manpower, equipment, and materials to support a sound Corrosion Control Program are identified and requested. Minimum requirements are:

4.1.7.1. **(Added-ANG)** An adequate corrosion control facility is available to wash aircraft, perform minor maintenance, and paint assigned aircraft. In addition, ensure that adequate back shop space is available to accomplish corrosion treatments and paint requirements for support equipment (SE) and aircraft parts.

4.1.7.2. **(Added-ANG)** facility-control technology meets both local, state, and federal Environmental Protection Agency requirements and National Emission Standards for Hazardous Air Pollutants (NESHAP).

4.2. **(Added-ANG)** Wing Corrosion Manager Responsibilities:

4.2.1. **(Added-ANG)** Organizes and manages the Corrosion Prevention Program IAW applicable publications.

4.2.2. **(Added-ANG)** Establish a corrosion-control training plan.

4.2.3. **(Added-ANG)** Ensure initial and refresher training is provided to aircraft maintenance personnel.

4.2.4. **(Added-ANG)** Verify that approved materials and equipment are used to support the Corrosion Control Program. Ensure corrective action is taken when discrepancies are noted.

4.2.5. **(Added-ANG)** Attend weapon(s) system CPAB, or send a designated representative. Requirement may be filled by MDS SPOC.

4.2.6. **(Added-ANG)** Attend DOD, Air Force, and ANG Corrosion Program Manager meeting and workshops. Requirement may be filled by MDS SPOC.

4.2.7. **(Added-ANG)** Coordinates with all aircraft maintenance functions for recommendations or suggestions that would enhance corrosion prevention and structural integrity of the assigned aircraft.

4.2.8. **(Added-ANG)** Submits CPAB action-items to the weapons-system corrosion SPOC or contractor support for review and coordination with MAJCOM and ALC Corrosion Managers.

4.3. **(Added-ANG)** ASM and LOASM Supervisor Responsibilities:

4.3.1. **(Added-ANG)** Ensure that corrosion inspections are accomplished during each phase/periodic inspection for aircraft by using weapon system-6 work cards or a locally devised work deck.

4.3.2. **(Added-ANG)** Ensure personnel complete a visual corrosion inspection after each aircraft wash using the Aircraft Post-Wash Corrosion Inspection (See Attachment 2), or locally developed guidance.

4.3.2.1. **(Added-ANG)** Verify that corrosion prevention and treatment procedures are accomplished according to technical order requirements.

4.3.3. **(Added-ANG)** Coordinates with the Maintenance Group Commander (MXG), Unit/Wing Corrosion Manager, and Quality Assurance to request depot assistance IAW T.O. 00-25-107, *Maintenance Assistance*, when corrosion treatments, structural repairs, LO coating and composite damage are beyond the unit's capability.

4.3.4. **(Added-ANG)** Ensure all personnel receive adequate training to accomplish assigned tasks, operate corrosion-prevention equipment, changes to inspection techniques, keep abreast of new qualified materials, and equipment and advances in composites and LO technologies.

4.3.5. **(Added-ANG)** Ensure no other maintenance is accomplished on aircraft or equipment during corrosion-prevention treatment/minor painting when hazardous/toxic materials are used, which require the use of personal protective equipment (PPE).

4.3.6. **(Added-ANG)** Ensure Bioenvironmental Services conduct initial baseline comprehensive evaluations, and provide annual follow-ups to determine adequacy of work center controls for occupational hazards.

4.3.7. **(Added-ANG)** Ensure ASM and LOASM (AFSC 2A7X3 and 2A7X5) personnel receive Occupational Physicals as deemed necessary by local Medical Group Aeromedical Services IAW AFM 30-130, *Base Level Military Personnel System Users Manual*, AFOSH Standard 161-17, *Standardized Occupational Health Program*, and AFI 48-101, *Aerospace Medical Operations*.

4.3.8. **(Added-ANG)** Manage the corrosion-control facility/washrack to include procurement of approved cleaning materials from the Qualified Products Lists (QPL), and other cleaning products listed in appropriate Technical Orders.

4.4. **(Added-ANG)** Aircraft Flight Chief/Element Supervisor Responsibilities

4.4.1. **(Added-ANG)** Accomplish a cleanliness inspection of the aircraft after completion of wash, using the Aircraft Post-Wash Cleanliness Inspection (See Attachment 3), or locally developed guidance. The Dock Supervisor may accomplish the cleanliness inspection for phase/periodic aircraft washes.

4.4.2. **(Added-ANG)** Appoint an aircraft wash supervisor (Crew Chief/Assistant Crew Chief) for each wash. The wash supervisor uses the Aircraft Pre-Wash Supervisor's

Guide (See Attachment 4), the Supervisor's Safety Briefing, (see Attachment 5), or locally developed guidance to brief personnel prior to starting a wash. The wash supervisor ensures the wash facility is clean; equipment is properly maintained, and stored at the completion of each wash.

4.4.3. **(Added-ANG)** Ensures that Aircraft Maintenance Squadron (AMXS) personnel are trained in the correct procedures for aircraft washing and cleaning using weapon-system technical data, job guides, and general information in T.O. 1-1-691, *Aircraft Weapon Systems Cleaning and Corrosion Control*.

4.4.4. **(Added-ANG)** Coordinates the use of wash rack/corrosion-control facilities, when necessary.

4.4.5. **(Added-ANG)** Procures and maintains personal protective equipment which is used during the wash process.

4.4.6. **(Added-ANG)** Performs washing and cleaning of assigned weapon system, using aircraft wash crews and approved cleaning materials authorized by T.Os and listed on Qualified Product Lists (QPL). Contract washes may be utilized to satisfy this requirement.

4.4.6.1. **(Added-ANG)** Units using wash contractors will be familiar with contract specifications, ensure the contractor is trained, uses approved materials (units may need to provide cleaning materials) and equipment, and follow applicable technical orders and inspection criteria. The unit will also provide a designated wash monitor who is responsible for the contract wash team at the time the work is accomplished to ensure safety and damage to the aircraft is avoided.

4.4.6.2. **(Added-ANG)** Identify contract discrepancies to Assigned QAR.

4.5. **(Added-ANG)** Quality Assurance Responsibilities:

4.5.1. **(Added-ANG)** Verify that approved materials and equipment are used to support the Corrosion Control Program. Wash crews are properly trained and Plans and Scheduling has scheduled washes IAW the Aircraft Wash Interval listed in T.O. 1-1-691. Validate through follow-up inspections that corrective action is taken when discrepancies are noted.

4.5.1.1. **(Added-ANG)** Ensure aircraft washes are inspected as part of the RIL listed in **AFI 21-101** for cleanliness, corrosion, and lubrication after washing.

4.5.1.2. **(Added-ANG)** Units using a wash contractor will have a QAR assigned. QAR will be familiar with contract specifications, ensure contractor personnel are trained; and approved materials and equipment are used properly.

4.5.2. **(Added-ANG)** It is recommended that personnel who evaluate aircraft wash operations attend an AF approved Aircraft Corrosion Control training course.

4.6. **(Added-ANG)** Avionics Supervisor Responsibilities:

4.6.1. **(Added-ANG)** Ensures an effective Corrosion Control Program is established and enforced for avionics components and equipment.

- 4.6.2. **(Added-ANG)** Ensures that assigned personnel receive corrosion prevention and control training under the direction of the Wing Corrosion Manager and the Avionics Supervisor.
- 4.6.3. **(Added-ANG)** Ensures avionics work sections are familiar with, and have available for use, T.O. 1-1-689, *Avionics Cleaning and Corrosion Control*.
- 4.6.4. **(Added-ANG)** Ensures avionics maintenance personnel inspect for corrosion. When corrosion damage is beyond the capability of the shop; request assistance from the ASM work center.
- 4.6.5. **(Added-ANG)** Enforces the use of approved cleaning products authorized by Technical Data and QPLs.
- 4.7. **(Added-ANG)** Aerospace Ground Equipment (AGE) Supervisor Responsibilities:
- 4.7.1. **(Added-ANG)** Ensures an effective Corrosion Control Program is established and enforced for assigned equipment.
- 4.7.2. **(Added-ANG)** Ensures that AGE maintenance personnel receive corrosion prevention and control training under the direction of the Unit Corrosion Manager and AGE supervisor.
- 4.7.3. **(Added-ANG)** Ensures powered and non-powered AGE is cleaned, thoroughly inspected, and touched-up as necessary during each periodic inspection see T.O. 1-1-691, T.O. 35-1-3, *Corrosion Prevention and Control, Cleaning, Painting, and Markings of USAF Support Equipment (SE)*. Units that operate within 1.25 miles (2km) of salt water should consider a 30 day wash/rinse program, and 15 day clear water rinse for all powered and non-powered equipment. A regular wash/rinse program and sheltering equipment will greatly improve the unit's ability to prevent corrosion and reduce UV degradation of protective coatings.
- 4.7.4. **(Added-ANG)** Enforces the use of approved cleaning products provided by Technical Data and Qualified Product Lists (QPLs).
- 4.7.4.1. **(Added-ANG)** Encourages the use of corrosion-preventative compounds (CPC).
- 4.7.5. **(Added-ANG)** Repainting will be determined by AGE supervision.
- 4.7.5.1. **(Added-ANG)** Surface preparation will be accomplished by owning work center.
- 4.7.5.2. **(Added-ANG)** Repainting will be accomplished by qualified AGE personnel, ASM/LOASM personnel, or qualified contractor. Units may also contact the ANG Regional Aircraft Paint facility, Sioux City Iowa who can scuff sand and repaint SE, on a limited basis, when slots are available.
- 4.8. **(Added-ANG)** Munitions Supervisor Responsibilities
- 4.8.1. **(Added-ANG)** Ensures an effective Corrosion Control Program is established and enforced for assigned missiles, munitions, handling equipment, and trailers.

4.8.2. **(Added-ANG)** Ensures that munitions-maintenance personnel receive corrosion prevention and control training under the direction of the Wing Corrosion Manager and Munitions Supervisor.

4.8.3. **(Added-ANG)** Ensures that equipment is cleaned and corrosion treated during each periodic inspection, IAW T.O. 1-1-691, T.O. 35-1-3, and specific equipment technical data. Units that operate within 1.25 miles (2km) of salt water should consider a 30 day wash/ rinse program, and 15 day clear water rinse for all powered and non-powered equipment. A regular wash/rinse program and sheltering equipment will greatly improve the unit's ability to prevent corrosion and reduce UV degradation of protective coatings.

4.8.4. **(Added-ANG)** Enforces the use of cleaning products approved by Technical Data and the QPLs.

4.8.5. **(Added-ANG)** Repainting will be determined by the Munitions and ASM/LOASM.

4.8.5.1. **(Added-ANG)** Surface preparation will be accomplished by the owning work center.

4.8.5.2. **(Added-ANG)** Repainting will be accomplished by qualified munitions personnel, ASM/LOASM personnel, or a qualified contractor. Units may also contact the ANG Regional Aircraft Paint facility, Sioux City Iowa who can scuff sand and repaint SE, on a limited basis, when slots are available

4.8.6. **(Added-ANG)** Encourage the use of CPCs.

4.9. **(Added-ANG)** Communication and Ground Based Electronic Equipment Units Commanders will.

4.9.1. **(Added-ANG)** Ensure the Maintenance Support (MS) Supervisor establishes a Corrosion Prevention and Control Program for ground mobile equipment, stressing prevention and control, through equipment cleanliness, timely detection, and maintenance of protective finishes.

4.9.2. **(Added-ANG)** Ensure adequate corrosion prevention and training program is in place for initial and recurring training.

4.9.3. **(Added-ANG)** Establish support as necessary with the host Aircraft Maintenance Squadron and Wing Corrosion Manager.

5. (Added-ANG) General Corrosion Prevention and Control.

5.1. **(Added-ANG)** Corrosion Prevention and Control Programs are oriented toward the preventative maintenance concept in controlling corrosion through the maintenance of protective coatings (Conventional and Low Observable), equipment cleanliness, timely detection, and corrective treatment. Prevention is the key of an effective Corrosion Control Program; therefore, strict adherence to corrosion-prevention polices is essential.

5.2. **(Added-ANG)** All maintenance personnel, regardless of AFSC (Air Force Specialty Code), are responsible for detecting and documenting corrosion in the proper maintenance forms. Accurate documentation of maintenance actions in support of the Corrosion Control Program is essential to equipment, training, and parts/material procurement requirements.

5.3. **(Added-ANG)** ASM/LOASM will evaluate corrosion discrepancies to determine proper treatment or repair.

5.4. **(Added-ANG)** Cross Flow of information is essential to the program and will enable maintenance personnel to communicate effectively with all echelons.

6. (Added-ANG) Washing Aircraft.

6.1. **(Added-ANG)** A complete exterior wash and interior cleaning will be accomplished on all ANG aircraft as directed by T.O. 1-1-691 and Specific Weapons System TOs during scheduled washes, prior to each phase/periodic inspection and after deployments.

6.2. **(Added-ANG)** Documentation requirements are listed in the Technical Order series 00-20.

6.3. **(Added-ANG)** Proper lubrication is vital in preventing corrosion. Lubrication prevents water intrusion into bearing cavities and causing corrosion. When personnel wash components, between normal cleaning cycles (flightline washes), re-lubrication is required.

6.4. **(Added-ANG)** Units must strictly adhere to scheduled aircraft wash cycles. Units must report all overdue washes directly to NGB/A4MM and the owning SPD.

6.5. **(Added-ANG)** Units with aircraft operating near or over salt water must comply with clear water rinsing requirements, IAW T.O. 1-1-691. Deployed units must use every means possible to meet wash and rinse requirements at the Forward Operating Location (FOL). If unable to meet wash and rinse requirements, a waiver must be obtained using the guidelines outlined in T.O.1-1-691. Deployed aircraft returning to home station are required a full wash and corrosion inspection within 5 days.

6.6. **(Added-ANG)** Aircraft latrine/urinal areas are severe corrosion-prone areas, and must be kept clean.

7. (Added-ANG) Corrosion Prevention and Control Training.

7.1. **(Added-ANG)** All aircraft maintenance personnel will receive locally developed corrosion prevention and control training under the direction of the Wing Corrosion Manager.

7.2. **(Added-ANG)** Refresher training will be accomplished annually IAW IMDS and GO81.

7.2.1. **(Added-ANG)** Personnel in the ASM and LOASM work centers are exempt from routine corrosion prevention and control training.

7.2.2. **(Added-ANG)** Corrosion training does not replace normal on-the-job (OJT) requirements for individuals in any career field.

7.3. **(Added-ANG)** The Wing Corrosion Manager or designated representatives will conduct training. The Corrosion Manager, assisted by the Unit Maintenance Training Manager, updates training materials and information, and develops training curriculum. Training curriculum must include the following:

7.3.1. **(Added-ANG)** Establishing procedures and techniques for identifying corrosion.

7.3.2. **(Added-ANG)** Identifying unit specific weapon systems and equipment corrosion-prone areas.

7.3.3. **(Added-ANG)** Documenting procedures for identifying corrosion.

7.3.4. **(Added-ANG)** Selecting and using sealants, corrosion-preventive compounds (CPCs), and lubricants.

7.3.5. **(Added-ANG)** Selecting and using approved cleaning materials.

8. (Added-ANG) Maintenance Painting

8.1. **(Added-ANG)** Protective coating systems, Conventional and Low Observable, provide protection for aircraft and aerospace ground powered and non-powered equipment surfaces. Specific Weapon System and Equipment Technical Orders determine protective coating systems selection.

8.2. **(Added-ANG)** Maintenance painting is the application of coatings to aerospace equipment where the existing coating is deteriorated, damaged, or missing. Conventional and Low Observable maintenance painting must be kept to a minimum, and comply with federal, state, and local environmental regulations. Maintenance painting of aircraft accomplished solely for cosmetics (beautification) is not authorized on ANG aircraft.

8.2.1. **(Added-ANG)** Aircraft stripping and repainting at field level is **not authorized**. When aircraft repainting is beyond the unit's capability; request assistance IAW T.O. 00-25-107, *Maintenance Assistance*. Fighter (A-10, F-15 and F-16) and HH-60 helicopter aircraft will be scheduled through the ANG Regional Paint Facility, 185 ARW, Sioux City, Iowa. This facility is annually funded by NGB/A4M and has the capability to provide a total scuff-sand and repaint following TO 1-1-8 and specific weapon system - 23 requirements.

8.2.1.1. **(Added-ANG)** F-16 Aircraft: A scuff sand and overcoat of the aircrafts exterior should be performed at intervals such that the total mil thickness of the finish system does not exceed 18 Mils. A coating Grid sheet (See attachment 8) and a digital coating thickness gauge (LP) will be required to determine when a coating system needs to be de-painted. When the total coating thickness reaches 15-18 mils, contact NGB/A4M to schedule into the Depot Speed Line Program.

8.3. **(Added-ANG)** Units equipped with environmentally compliant aircraft painting facilities are authorized to perform mid-interval over coating of aircraft. LO aircraft (F-22) may be re-painted, per technical data, at units with Restoration Bays. Conventional over-coating should be accomplished no earlier than the mid-point of the coating-service life. Work processes will be coordinated with local Environmental and Bioenvironmental offices.

9. (Added-ANG) AIRCRAFT MARKINGS

9.1. **(Added-ANG)** Aircraft exterior finishes and markings will be applied to aircraft in accordance with the following guidelines. (See Attachment 6, ANG Aircraft Markings, Attachment 7, Typical ANG Tail Marking Configuration and Attachment 8, F-16 Exterior Coating Grid).

10. (Added-ANG) Unit Nondestructive Inspection Program

10.1. **(Added-ANG)** Maintenance Group Commander Responsibilities

10.1.1. **(Added-ANG)** Ensure that applicable programming documents (budget, facilities, manpower, maintenance, etc.) include the need for NDI support.

10.1.2. **(Added-ANG)** Ensure the environmental controls are managed IAW T.O. 33B-1-1, *Nondestructive Inspection Methods*

10.2. **(Added-ANG)** Nondestructive Inspection (NDI) Lab Supervisor Responsibilities:

10.2.1. **(Added-ANG)** Organizes, directs, and manages the NDI Program IAW T.O. 33B-1-1 and applicable publications.

10.2.2. **(Added-ANG)** When possible, attends DOD, Air Force Worldwide, and ANG Command NDI meetings and workshops.

10.2.3. **(Added-ANG)** Ensures only properly trained and certified personnel with AFSC 2A7X2 operate NDI equipment.

10.2.4. **(Added-ANG)** Ensures personnel performing NDI attend the AETC basic and seven level courses, or Air Force NDI Program Office approved civilian equivalent courses.

10.2.5. **(Added-ANG)** Ensures personnel receive adequate training (formal and OJT) to accomplish assigned tasking, and to acquire skills necessary for changes in inspection techniques and advances in equipment technology.

10.2.6. **(Added-ANG)** Ensures Bioenvironmental Services conduct initial baseline comprehensive evaluations, and provide annual follow-ups to determine adequacy of work-center controls for occupational hazards.

10.2.7. **(Added-ANG)** Ensures NDI personnel receive Occupational Health Physicals (OHPs) as deemed necessary by local Medical Group Aero medical Services IAW applicable publications.

10.2.8. **(Added-ANG)** Ensure that proper documentation is maintained to show qualification for those personnel performing F15/F16 Pratt & Whitney F100-PW-220/220E 4k Fan Drive Turbine 4th Stage Turbine Blade, Eddy Current Inspection.

11. (Added-ANG) Unit Oil Analysis Program (OAP) (When applicable)

11.1. **(Added-ANG)** Maintenance Group Commanders' Responsibilities

11.1.1. **(Added-ANG)** Ensures applicable programming documents (budget, facilities, manpower, maintenance, etc.) include the need for OAP support.

11.1.2. **(Added-ANG)** Ensures units that operate and maintain aircraft implement an Oil Analysis (OA) program. Unit responsibilities are specified in T.O. 33-1-37 series, Joint Oil Analysis Program Manuals.

11.1.3. **(Added-ANG)** Ensures units submit accurate and timely Quality Deficiency Reports to the Air Force OAP Office on equipment requiring tear down or overhaul due to an OAP laboratory maintenance recommendation.

11.1.4. **(Added-ANG)** Ensures the following environmental controls are maintained in the OAP lab:

11.1.4.1. **(Added-ANG)** Temperature of 75 degrees F +/-3 degrees, IAW T.O. 33-1-37-2, Joint Oil Analysis Program Manual, volume II, *Spectrometric and Physical Test Laboratory Operating Requirements and Procedures*.

11.1.4.2. **(Added-ANG)** Humidity of 50% or less (IAW T.O. 33-1-37-2).

11.1.5. **(Added-ANG)** Ensures the Maintenance Operation Center maintains an OAP status on each assigned aircraft.

11.1.6. **(Added-ANG)** Assigns assistant managers in writing (preferably flightline expeditors, pro-supers, or flight chiefs on each shift) and provides the OAP lab with a current list of managers. They are the SPOC for the OAP lab concerning samples and discrepancies.

11.1.7. **(Added-ANG)** Ensures that OAP Samples are take from all oil carts used for Oil Servicing on Engines and Aircraft IAW T.O. 33-1-37-1, Page 3-7 Para (4) and Page 3-8, para (5) or when an oil cart is refilled with oil. Also ensure that an OAP sample is taken from every newly opened drum of Turbine Engine Oil used to fill the oil carts.

11.1.8. **(Added-ANG)** Ensures that all oil samples sent to the OAP Lab for testing are accompanied by completed DD Form 2026, *Oil Analysis Sample Request*.

11.1.9. **(Added-ANG)** Each MXG publishes an OI giving detailed guidance for accomplishing the OAP as specified in this publication and other applicable guidance.

11.2. **(Added-ANG)** Propulsion Shop Supervisor Responsibilities:

11.2.1. **(Added-ANG)** Is assigned as the primary unit OAP Manager.

11.2.2. **(Added-ANG)** Conducts periodic OAP meetings (at least twice annually) consisting of all OAP Managers, Assistants, and the NDI Lab Supervisor or designated representative. The purpose of these meetings is to resolve base OAP problems and familiarize all personnel with any program changes.

11.2.3. **(Added-ANG)** Ensures a copy of DD Form 2027 or computer-generated copy of the Oil Analysis Record accompanies each engine undergoing depot maintenance.

11.2.4. **(Added-ANG)** Determines follow-on engine maintenance requirements based upon oil analysis recommendations.

11.3. **(Added-ANG)** Nondestructive Inspection (NDI) Lab Supervisor Responsibilities:

11.3.1. **(Added-ANG)** Is assigned as the alternate OAP Manager.

11.3.2. **(Added-ANG)** Ensures only properly trained personnel operate OAP equipment IAW T.O. 33-1-37 Qualifications Required for Operators and Evaluators.

11.3.3. **(Added-ANG)** During contingency or mobility moves, ensures deployable spectrometers are properly packaged and secured when being removed from the OAP Lab.

11.3.4. **(Added-ANG)** Ensures assigned OAP spectrometers are Joint Oil Analysis Program (JOAP) certified IAW T.O. 33-1-37-1, Joint Oil Analysis Program Manual, volume I, *Introduction, Theory, Benefits, Customer Sampling Procedures, Programs, and*

Reports. Ensures assigned OAP spectrometers maintain a three-month correlation average of 80% or better.

11.3.5. **(Added-ANG)** Ensures OAP Lab inputs accurate and timely data into the central database.

11.3.6. **(Added-ANG)** NDI personnel will not be designated as OAP monitors when an off-base OAP Lab is servicing the unit.

11.4. **(Added-ANG)** Oil Sampling Procedures:

11.4.1. **(Added-ANG)** Instructions and procedures for sampling, documenting forms, reporting data, obtaining supply requirements, and taking special samples are as specified in T.O. 33-1-37 series, and weapon specific technical data.

11.4.2. **(Added-ANG)** Intervals for sampling requirements are as specified in the applicable weapon system specific scheduled maintenance or periodic inspection document (-6) and this document.

11.4.2.1. **(Added-ANG)** All fixed-wing fighter aircraft assigned to Air National Guard (ANG) will be sampled IAW the applicable Scheduled Maintenance or Periodic Inspection Document (-6) but will not exceed 10 flying hours between samples.

11.4.2.2. **(Added-ANG)** Single engine fixed wing fighter aircraft that require sampling after every flight and are not in a surveillance status may be allowed to fly one additional sortie but may not be flown 3 consecutive sorties without oil sample results known.

11.4.2.3. **(Added-ANG)** Multi-engine fixed wing fighter aircraft on alert status, but not in surveillance, will be sampled after the first flight of the day or as specified in the applicable -6. All efforts should be made to have OAP results known prior to the next day's flying. In the event OAP capability is unavailable, aircraft may be kept on alert status and launched in support of an alert sortie provided that no more than 10 operating hours have passed since last known OAP result.

11.4.3. **(Added-ANG)** Take sample prior to adding oil.

11.5. **(Added-ANG)** The following procedures apply when in a transient or cross-country status/deployed status:

11.5.1. **(Added-ANG)** Aircraft Commander shall ensure aircraft are sampled IAW applicable -6 requirement while in transient status.

11.5.2. **(Added-ANG)** Flightline personnel place an oil analysis record (DD form 2027 or automated product) with a minimum of the last ten sample readings in the aircraft records jacket.

11.5.3. **(Added-ANG)** During unit deployments OAP personnel will hand-carry the DD Form 2027 (or automated product) as well as provide a copy for each deploying aircraft's records jacket. If OAP personnel are not included in the deployment, the deploying unit OAP Manager ensures the copies of DD Form 2027 (or automated product) are delivered to the supporting OAP Lab, retrieved upon redeployment, and delivered to the home-station OAP Lab as soon as possible.

11.5.4. **(Added-ANG)** Every effort shall be made to obtain Oil Analysis support at transient locations. Oil samples will be taken, when required regardless of local oil analysis capability.

11.5.5. **(Added-ANG)** When OAP capability exists at a transient location and a sample is required, the aircrew will obtain the sample results before departure.

11.5.6. **(Added-ANG)** If sample results cannot be provided due to time restraints, the aircrew will request transient maintenance personnel forwarded the results by telephone or fax to the next destination. The aircrew will **ensure** a standard entry is placed in the AFTO Form 781A, *Maintenance Discrepancy and Work Document*, before departure. 781A entry is: **Engine oil analysis results are unknown.**

11.5.7. **(Added-ANG)** If sample results cannot be provided due to lack of OA capability, samples will be taken at the departure base and carried to and processed at the next destination. Aircrew ensures a standard entry is placed in the AFTO Form 781A as specified in previous paragraph.

11.5.8. **(Added-ANG)** In no case will single engine fixed-wing aircraft fly more than two consecutive sorties without Oil Analysis sample results being known (Exception: F-16s with F110-GE-100/-129 engines will be sampled IAW -6 requirements).

11.5.9. **(Added-ANG)** Multi-engine fixed wing fighter aircraft will be sampled after the first flight of the day or as specified in the applicable -6.

12. **(Added-ANG)** Local Supplements

12.1. **(Added-ANG)** Each MXG publishes a local supplement IAW **AFI 33-360** to this instruction giving detailed guidance for accomplishing OA. Guidance will include but is not limited to:

12.1.1. **(Added-ANG)** Designating the responsibility to the AMXS (Aircraft Maintenance Squadron) for taking aircraft samples and delivering them to the OAP Lab.

12.1.2. **(Added-ANG)** Cover training requirements for all affected personnel.

12.1.3. **(Added-ANG)** Provide procedures for backup support in the event the oil analysis spectrometer is out of commission.

12.1.4. **(Added-ANG)** Provide procedures to ensure aircraft under special surveillance have samples analyzed before the next flight or engine operation.

12.1.5. **(Added-ANG)** Include procedures to ensure aircraft under special surveillance are flown only on home-station flights. Owing unit MXG waiver is required for extenuating circumstances.

12.1.6. **(Added-ANG)** Oil samples, when due, are taken following specific TO requirements.

12.1.7. **(Added-ANG)** Include procedures to ensure an information interchange is established between the Propulsion Shop and OAP Lab.

12.1.8. **(Added-ANG)** Provide procedures for including the OAP Lab during aircraft records document reviews.

12.1.9. **(Added-ANG)** Ensure procedures establishing proper communication channels regarding abnormal trends when detected.

12.1.10. **(Added-ANG)** Provide procedures to ensure the Propulsion Shop sends a message to the respective Air Logistics Center OAP Manager, when an engine or a major component is sent to depot as a result of oil analysis.

12.1.11. **(Added-ANG)** Define the duties and responsibilities of the assistant and alternate managers.

MICHAEL E. ZETTLER, Lt Gen, USAF
DCS/Installations and Logistics

(ANG)

HARRY M. WYATT III
Lieutenant General, USAF
Director, Air National Guard

Attachment 1**GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

(Added-ANG) AFMAN 48-155, Occupational and Environmental Health Exposure Controls, 1 October 2008

AFI 21-101, *Air and Space Equipment Maintenance Management*

AFI 33-360, Volume 1, *Publications Management Program*

AFI 36-2232, *Maintenance Training*

AFI 63-111, *Contract Support for Systems and Equipment*

AFFPD 21-1, *Air and Space Maintenance*

(Added-ANG) AFI 21-101_ANGSup_I, *Air and Space Equipment Maintenance Management*, 14 March 2008

(Added-ANG) AFI 21-124, *Air Force Oil Analysis Program*, 4 April 2003

(Added-ANG) AFI 48-101, *Aerospace Medical Operations*, 19 August 2005

(Added-ANG) AFI 63-1001, *Aircraft Structural Integrity Program*, 18 April 2002

(Added-ANG) AFI 63-101, *Acquisition and Sustainment Life Cycle Management*, 17 April 2009

DoDD 5025.12, *Standardization of Military and Associated Terminology*

JP 1-02, *DoD Dictionary of Military and Associated Terms*

(Added-ANG) AFOSH Standard 48-137, *Respiratory Protection Program*, 10 February 2005

(Added-ANG) AFOSH Standard 91-100, *Aircraft Flight Line - Ground Operations and Activities*, 01 May 1998

(Added-ANG) AFOSH Standard 91-110, *Nondestructive Inspection and Oil Analysis Program*, 1 July 1997

(Added-ANG) AFOSH Standard 91-501, *Air Force Consolidated Occupational Safety Standard*, 7 July 2004

(Added-ANG) AFOSH Standard 91-66, *General Industrial Operations*, 1 October 1997

(Added-ANG) T.O. 00-25-107-WA-1, *Maintenance Assistance*, 15 July 2009

(Added-ANG) T.O. 1-1-689, *Avionics Cleaning and Corrosion Prevention/Controls*, 1 March 2005

(Added-ANG) T.O. 1-1-691, , *Aircraft Weapons Systems Cleaning and Corrosion Control*, 2 November 2009

(Added-ANG) T.O. 1-1-8, *Application of Organic Coatings*, 15 February 2006

(Added-ANG) T.O. 33-1-37, *Series, Joint Oil Analysis Program Manuals*, 12 September 2008

(Added-ANG) T.O. 33B-1-1-WA-1, *Nondestructive Inspection Methods*, 1 October 2009

(Added-ANG) T.O. 35-1-3, *Corrosion Prevention and Control, Cleaning, Painting and Marking of USAF Support Equipment (SE) National Institute for Occupational Safety and Health (NIOSH) Publications Standards, Department of Labor Occupational Safety and Health (OSHA) Standards*, 1 September 2006

Abbreviations and Acronyms

(Added-ANG) **C-E**—Communications Electronics

(Added-ANG) **AETC**—Air Education and Training Command

(Added-ANG) **AFCPO**—Air Force Corrosion Program Office

AFI—Air Force Instruction

(Added-ANG) **AFM**—Air Force Manual

AFMC—Air Force Materiel Command

(Added-ANG) **AFOSH**—Air Force Occupational Safety and Health

AFPD—Air Force Policy Directive

AFRL—Air Force Research Laboratory

(Added-ANG) **AFSC**—Air Force Specialty Code

(Added-ANG) **AGE**—Aerospace Ground Equipment

ALC—Air Logistics Center

(Added-ANG) **AMXS**—Aircraft Maintenance Squadron

ANG—Air National Guard

(Added-ANG) **ANGRC**—Air National Guard Readiness Center

ARC—Air Reserve Component

ASIP—Aircraft Structural Integrity Program

(Added-ANG) **ASM**—Aircraft Structural Maintenance

CPAB—Corrosion Prevention Advisory Board

(ANG) **CPAB**—Corrosion Prevention Advisory Board

(Added-ANG) **CPC**—Corrosion Preventive Compound

CPCO—Corrosion Prevention and Control Office

(Added-ANG) **CTIO**—Coating Technology Integration Office

(Added-ANG) **CTSC**—Coating Technology Screening Committee

(Added-ANG) **DOD**—Department of Defense

ENSIP—Engine Structural Integrity Program

ESOH—Environment, Safety and Occupational Health

FY—Fiscal Year

(Added-ANG) GMAJCOM—Gaining Major Command

HAF—Headquarters Air Force

IAW—In Accordance With

(Added-ANG) JOAP—Joint Oil Analysis Program

JP—Joint Publication

LO—Low Observable

(Added-ANG) LO/ASM—Low Observable Aircraft Structural Maintenance

MAJCOM—Major Command

(Added-ANG) MS—Maintenance Support

(Added-ANG) MSDS—Material Safety Data Sheet

(Added-ANG) MXG—Maintenance Group Commander

NDI—Non Destructive Inspection

NDIAB—Non Destructive Inspection Advisory Board

(Added-ANG) NESHAP—National Emission Standards for Hazardous Air Pollutants

(Added-ANG) OA—Oil Analysis

(Added-ANG) OAP—Oil Analysis Program

(Added-ANG) OHP—Operation Health Physical

(Added-ANG) OJT—On the Job Training

OPR—Office of Primary Responsibility

(Added-ANG) OSHA—Occupational Safety and Health Association

PGM—Product Group Manager

POD—Probability of Detection

(Added-ANG) PPE—Personal Protective Equipment

(Added-ANG) QPL—Qualified Products List

RDT&E—Research, Development, Test and Evaluation

(Added-ANG) SE—Support Equipment

SM—Single Manager

SME—Subject Matter Expert

SPD—System Program Director

(Added-ANG) SPOC—Single Point of Contact

TO—Technical Order

U&TW—Utilization and Training Workshop

USAF—United States Air Force

Terms

Advanced Composites—Composite materials consist of two or more distinct components. Advanced composites are made by embedding high strength and high stiffness fibers within a resin, metal or ceramic matrix.

Advisory Boards—A board of subject matter experts in the fields of air and space materials, aircraft structural maintenance, depot and fielded production. The board reviews contractual requirements, prepares design guidance and periodically surveys contractor activities to provide technical guidance necessary to ensure the contractor conforms to the goals of the program.

Air and Space Equipment—Equipment used and maintained to meet the Air Force mission. It includes aircraft, missiles, space equipment, communications-electronic equipment, avionics, engines, training equipment, support equipment, aircraft and space ground equipment, sound suppressor systems, test, measurement and diagnostic equipment and major end items of all equipment.

Aircraft Structural Integrity Program (ASIP)—A program applied to an aircraft system to improve design, prevent structural failures, give a basis for corrective action, and predict operational life expectancy of the weapon system.

Clearing House—A central site used for purchasing large quantities of materials, repackaging these materials into smaller lots and distributing them to field units.

Corrosion—The deterioration of material due to electromechanical or chemical attack resulting from exposure to natural or induced environmental conditions or from the destructive attack of fungi or bacteria.

Corrosion Prevention—The process to preclude corrosion by proper material choice and design.

Corrosion Prevention Advisory Board (CPAB)—A board of subject matter experts in the fields of air and space materials, aircraft structural maintenance, depot and fielded production. The board reviews contractual requirements, prepares design guidance and periodically surveys contractor activities to provide technical guidance necessary to ensure the contractor conforms to the goals of the program.

Corrosion Program—A planned and organized effort to prevent, detect and control corrosion in order to reduce corrosion damage to any weapon system, air and space or ground equipment.

Engine Structural Integrity Program (ENSIP)—An organized and disciplined approach to the structural design, analysis, qualification, production and life management of air and space vehicle engines.

Inter-Service Maintenance Support—Maintenance either recurring or nonrecurring, performed by the organic capability of one Military Service, or element of it, in support of another Military Service or element.

Level III NDI—An individual with the skills and knowledge to interpret standards, select the method and technique for a specific inspection, and prepare and verify the adequacy of procedures. Only individuals with level III certification have the authority to approve NDI.

Low Observable (LO)—A technology used to minimize the detection of air and space vehicles.

Maintenance Training—Any proficiency, qualification, or certification tasking required by a technician to perform duties in their primary Air Force Specialty.

Materiel—Hardware, equipment, software, or any combination thereof, associated with DoD weapon systems and their related spares, repair parts, and support necessary to equip, operate, maintain and support military activities for administrative, support or combat purposes.

Non Destructive Inspection (NDI)—A process to determine the quality, integrity, properties, materials, and components without damaging or impairing their serviceability. This is done primarily by using liquid penetrant, magnetic particle, eddy current, ultrasonic and radiographic methods.

Paint Facility—A specially constructed facility with proper ventilation, breathable air system, lighting, waste disposal system and environmental control to permit chemical/mechanical stripping and repainting of systems and equipment.

Readiness—The ability of US military forces to fight and meet the demands of the national military strategy. Unit readiness is the ability to provide capabilities required by the combatant commanders to execute their assigned missions.

Single Manager—The generic title for a designated Air Force Materiel Command System Program Director (SPD), Product Group Manager (PGM) or Material Group Manager (MGM).

System Program Director (SPD)—An individual who is ultimately responsible and accountable for decisions and resources in overall program management of a military system. The SPD is the single person, identified in a Program Management Directive (PMD), who is charged with all cost, schedule, performance and sustainment aspects of a directed acquisition program. The SPD's primary customer is the using major command.

Technical Order—An AF publication that gives specific technical directives and information on inspection, storage, operation, modification and maintenance of given AF items and equipment.

Utilization and Training Workshop—A forum and quality control tool to determine and manage career field education and training requirements as they apply to mission needs.

Attachment 2 (Added-ANG)

AIRCRAFT POST WASH CORROSION INSPECTION

A2.1. Purpose: To provide general, minimum, requirements for performing aircraft post-wash corrosion inspections. Units may add requirements as necessary to enhance corrosion inspection procedures. Copying of this attachment is authorized.

A2.2. ASM and LOASM work center responsibilities:

A2.2.1. Upon completion of this inspection, corrosion discrepancies found are entered in the applicable records.

A2.2.2. Clear post-wash corrosion inspection from aircraft AFTO 781A.

A2.3. Instructions: Inspect aircraft for the following conditions: corrosion, residual water, soap residue, paint- condition, sealant-condition using Table A2.1.

A2.3.1. Column 1: Minimum corrosion prone areas to be inspected.

A2.3.2. Column 2: Verify inspection complied with by placing a checkmark in this column.

A2.3.3. Column 3: Place a checkmark if area does not apply to weapon system.

A2.3.4. Column 4: Enter findings in this column.

Table A2.1. Aircraft Post-Wash Corrosion Inspection

Tail Number:			Date:
Minimum Corrosion Prone Area To Be Inspected	Inspection Complied With	Area Does Not Apply To Weapons System	Findings/Remarks
<i>Landing Gear</i>			
NLG wheels			
NLG assembly			
NLG wheel well			
MLG wheels			
MLG assembly			
MLG wheel wells			
<i>Fuselage External</i>			
Bottom Of Fuselage			
Tip of radome to NLG			
NLG to MLG			
MLG to tail			

<i>Sides and Top</i>			
Nose to wing root area			
Fwd wing root to aft wing root			
Aft wing root to tail			
<i>Empennage External</i>			
Vertical stabilizer			
Horizontal stabilizer			
Tail Pylon (Helicopters)			
<i>Engines</i>			
Nacelle areas			
Cowling			
Intake			
Exhaust Path			
Minimum Corrosion Prone Area To Be Inspected	Inspection Complied With	Area Does Not Apply To Weapons System	Findings/Remarks
Propeller/rotor blades			
Pylons			
<i>Wings</i>			
Top of left wing			
Bottom of left wing			
Left wing flapwell			
Top of right wing			
Bottom of right wing			
Right wing flap well			
<i>Aircraft Interior</i>			
Cargo compartment floor			
Lt chine cover			
Rt chine cover			
Battery compartment			
Galley			

Flight Deck/cockpit			
Latrine/urinal area			

Attachment 3 (Added-ANG)

AIRCRAFT POST-WASH CLEANLINESS INSPECTION

A3.1. Purpose: To provide general, minimum, requirements for performing aircraft post-wash cleanliness inspections. Units may add requirements as necessary to enhance cleanliness inspection procedures. Copying of this table is authorized. Completed inspections sheets will be kept on file for at least one calendar year.

A3.2. Definitions: Clean. All references to the condition of clean pertain to the following description: To determine if surfaces are clean, a close visual inspection is accomplished to ensure all residues, oily film, and streaking has been removed.

A3.3. General: The aircraft post-wash cleanliness inspection is accomplished by the Flight Chief/Element or Isochronal Inspection (ISO) Dock Supervisor.

A3.4. Documentation: The following entries are recommended:

A3.4.1. Aircraft taped and prepped for wash. This entry is entered in the forms on a red X prior to the wash. It is cleared after the cleanliness inspection is successfully completed.

A3.4.2. Aircraft due cleanliness inspection. This entry is placed on a red dash, and cleared by the Flight Chief /Element Supervisor.

A3.4.3. Aircraft due corrosion inspection. This entry is placed on a red dash, and cleared by the ASM work center.

A3.4.4. Aircraft due lube after wash. This entry is entered in the forms on a red X.

Table A3.1. Aircraft Post-Wash Cleanliness Inspection

Tail Number:		Date:	
Landing Gear (grease, dirt, oil, brake dust, tire deposits, & soap residue)			
	CLEAN	DIRTY	REMARKS
NLG wheels			
NLG assembly			
NLG wheel well			
MLG wheels			
MLG assembly			
MLG wheel wells			
Fuselage External (dirt, oil, grease, trapped fluids & soap residue)			
	CLEAN	DIRTY	REMARKS
Bottom of fuselage			
Tip of radome to NLG			
NLG to MLG			

MLG to tail			
Sides and Top			
	CLEAN	DIRTY	REMARKS
Nose to wing root area			
Fwd wing root to aft wing root			
Aft wing root to tail			
Empennage External			
	CLEAN	DIRTY	REMARKS
Vertical stabilizer			
Horizontal stabilizer			
Tail Pylon (Helicopters)			
Nacelle (dirt, debris, oil, grease, soap residue & exhaust path residue)			
	CLEAN	DIRTY	REMARKS
Nacelle areas			
Cowling			
Intake			
Exhaust Path			
Nacelle (Continued) (dirt, debris, oil, grease, soap residue & exhaust path residue)			
	CLEAN	DIRTY	REMARKS
Propeller / Rotor Blades			
Pylons			
Aircraft Interior (dirt, debris, stains, spilled or trapped fluids)			
	CLEAN	DIRTY	REMARKS
Cargo compartment floor			
Lt chine cove			
Rt chine cove			
Battery compartment			
Galley			
Flight Deck / Cockpit			
Latrine/Urinal (urine, residue, dirt, debris, stains, spilled or trapped fluids)			
	CLEAN	DIRTY	REMARKS
Latrine/Urinal/Surroundings			

Wings (dirt, oil, grease, trapped fluids, and soap residue)			
	CLEAN	DIRTY	REMARKS
Top of left wing			
Bottom of left wing			
Left wing flap well			
Top of right wing			
Bottom of right wing			
Right wing flap well			

Attachment 4 (Added-ANG)

AIRCRAFT PRE-WASH SUPERVISOR'S GUIDE

- A4.1.** Are all eyewash and showers inspected and in operating condition? Is the wash facility clean?
- A4.2.** Is the air pressure source regulated to equipment specifications?
- A4.3.** Is all Personal Protective Equipment (PPE) in serviceable condition?
- A4.4.** Is there enough PPE for all personnel?
- A4.5.** Is the aircraft properly configured for wash?
- A4.6.** Is an approved soap used IAW T.O. 1-1-691 and the QPL?
- A4.7.** Are all stands and washing equipment inspected and in serviceable condition?
- A4.8.** Are all applicable Material Safety Data Sheets (MSDS's) available at the work location?
- A4.9.** Is the mixture of soap and water IAW T.O. 1-1-691 or the manufacturer's instructions?

Attachment 5 (Added-ANG)**SUPERVISOR'S SAFETY BRIEFING**

A5.1. Explain the use of PPE.

A5.2. Explain the proper use of all safety equipment and show all personnel the location of eyewash stations, shower, and emergency exits.

A5.3. Brief all personnel, including Wash Contractors, on workplace hazards:

A5.3.1. Wet floors

A5.3.2. Hoses on floor

A5.3.3. Pushing stands on wet floors

A5.3.4. Aircraft protrusions hazards

A5.3.5. Water and soap dripping from aircraft

A5.3.6. Standing on aircraft without proper safety gear

A5.3.7. Working in wheel well's, dangers of bumping head and sharp objects

A5.3.8. Air pressure adjustments

A5.3.9. Using maintenance stands that are wet

A5.4. Brief all personnel on MSDS's that are applicable:

A5.4.1. Brief specific hazards of chemicals

A5.4.2. Brief emergency and first aid procedures for the specific chemicals

A5.4.3. Brief location of MSDSs

Attachment 6 (Added-ANG)

ANG AIRCRAFT MARKINGS

A6.1. Aircraft Marking Guidance:

A6.1.1. This attachment implements the polices outlined in AFI 21-105, *Air and Space Equipment Structural Maintenance*, and provides guidance for applying command approved, non-USAF standard, aircraft marking, as authorized in T.O. 1-1-8.

A6.1.2. Paint schemes/configurations and USAF standard aircraft markings will be applied in accordance with T. O. 1-1-8, Specific Weapons System –23, or SPD approved aircraft drawings.

A6.1.3. Aircraft markings will be applied to aircraft as specifically authorized by NGB/A4MM, this instruction, TO 1-1-8, Specific Weapon Systems T.O.s or approved drawings.

A6.1.4. Aircraft inputs to depot will be marked IAW Air Force directives, unless otherwise approved by NGB/A4M.

A6.1.5. NGB/A4MM is the point of contact (POC) for ANG aircraft painting and markings. For ACC-gained aircraft, HQ ACC/A4MS is the POC for 2-digit unit-designation markings, when used.

A6.2. Appearance Standards:

A6.2.1. All aircraft markings and basic paint schemes will be maintained intact, legible, and distinct in color. Standardization of markings (by MDS) is of primary concern.

A6.2.2. Fighter units (A-10, F-16 and F-15) are recommended to overcoat their aircraft at the mid-point of their scheduled PDM/Speed line cycle to maintain the coating system integrity and aircraft appearance. Units will accomplish touch-up maintenance painting at home station, when possible, and use the ANG Regional Paint Facility, Sioux City, Iowa, when mid-cycle over-coating is required.

A6.2.2.1. F22 Units/Associates may accomplish major touch-up per specific TO Instructions where restoration facilities are available. Full de-paint and re-paints will be done by Depot/Contractor personnel.

A6.2.3. Large aircraft units should rely on touch-up maintenance painting between depot cycles to maintain coating integrity. Overcoats will be scheduled through the depot/contractor by NGB/A4MA on a case-by-case basis.

A6.2.4. Fully over coated aircraft will be documented in IDMS/GO81 and the individual aircraft AFTO Form 95 for tracking purposes. Weight and balance after a complete overcoat may be required. Check specific weapon T.O. guidance.

A6.2.5. Touch Up Guideline: Minor: 2-sq ft or less, Major: 2-sq ft or larger. Minor includes, but not limited to, nicks, scratches, panel edges, rusty fasteners, or when new fasteners are installed during panel up. Major: includes, but not limited to, leading edges, large repairs, removable panels, wheels, or new parts.

A6.3. Marking Options: The following options from T.O. 1-1-8 are delegated to the Wing Commander:

A6.3.1. May authorize solar-resistant finishes for personnel carriers or special purpose/mission aircraft.

A6.3.2. May authorize a distinguishing colored horizontal stripe for application on both sides of the middle or top-most portion of the vertical fin and rudder, if applicable. Flat colors or contrasting grays can be used but must match gloss requirements of the basic paint scheme.

A6.3.2.1. The state/city name within the tail stripe may be used. Nicknames in the tail stripe are not authorized. Exception: 130 AW Charleston WV is authorized to use "Charlie West" to reduce confusion within military circles with Charleston SC or Charleston AFB.

A6.3.2.2. Tail art may be used, such as Bird of Prey type marking. Size and location TBD by the unit, but must not interfere with mandatory marking or existing camouflage patterns. Only flat colors are allowed and must match gloss requirements of the basic paint scheme can be applied. **Note:** Changing the color(s)/pattern(s) on vertical tail(s) is not authorized without SPD approval.

A6.3.3. May authorize special aircraft markings that reflect mission activity, crew accomplishment, and unit esprit de corps, within the following guidelines:

A6.3.3.1. Markings can be applied on nose, tails, engine nacelles, gear doors, drop tanks, and travel pods. Markings must be applied in flat colors or contrasting grays that match gloss requirements of the basic paint scheme.

A6.3.4. Names of pilots, crew chiefs, or other members of the flight/ground crew maybe applied, IAW T.O. 1-1-8. Applications of nicknames and/or call signs are not authorized. Units must remove all air crew & crew chief names and ensure that area(s) where these names are placed are not legible when the stencil or vinyl lettering is removed. These areas may need re-painted prior to deploying into hostile environments.

A6.3.5. May authorize location of placards indicating armament loads on camouflaged aircraft, if not otherwise specified.

A6.3.6. ANG Wings that Associate will follow guidance IAW AFI 21-101 and AFI 90-1001. Host Guidance will be followed.

A6.4. Nonstandard Markings: *All nonstandard markings must be approved by NGB/A4MM.* Semi-gloss or high gloss colors are not authorized on any camouflage or flat gray aircraft. Tail numbers must not be altered, downsized, or moved, unless approved by the weapons system SPD and NGB/A4MM. Units will forward a clear/detailed color photograph of their aircraft that depict nonstandard markings. A letter of approval from the Wing Commander must accompany all photos. Photos (digital) will be provided to NGB/A4MM for approval. If markings are changed in the future, new photos and approval letter from the Wing Commander must be forwarded within 30 days of the change. Original letters of approval must be kept on file at the unit for inspection purposes. Digital photos can be sent by email (call DSN 278-8715 for email address) or provided on CD by mail to: NGB/A4MM, Attention: Maintenance Functional Manager, 3500 Fetchet Avenue, Andrews AFB MD 20762-5157.

A6.4.1. Nose Art: For the purpose of clarification, “Nose Art” will be the term used to identify specialized artwork applied to specific areas of the aircraft. Nose art is authorized for all ANG owned aircraft. LO aircraft will use coating materials approved for that specific aircraft. No vinyl or decals will be allowed on the outer mod line of an LO aircraft. Wing Commanders must approve all nose art, in writing, and be responsible for issues associated with its application. Nose art will not exceed 18 inches for fighter aircraft, 36 inches for large aircraft, not infringe on mandatory aircraft markings and meet the gloss requirements of the original paint scheme. Units that are called upon to perform in a hostile environment may be required to remove nose art prior to deployment or at the FOL. Nose art must:

A6.4.1.1. Be distinctive, symbolic, and designed in good taste.

A6.4.1.2. Enhance unit pride.

A6.4.1.3. Be gender neutral.

A6.4.1.4. Match gloss requirements of the basic paint scheme.

A6.4.1.5. Units will be responsible for all copyright issues.

A6.4.2. Aircraft Names: Naming of aircraft (i.e. City of ..., Spirit of..., etc.) will be accomplished IAW this instruction. Coordinate requests for naming aircraft through NGB/A4MM who will forward to HQ USAF/A4L for Approval consideration by AF/CV. This is to ensure that the intended name reflects favorably on the US Military, the Air Force and the Air National Guard.

A6.4.3. Competition Aircraft: Units participating in competitions such as William Tell, Gun Smoke, Tiger Meet, Red Flag, etc., will follow the guidelines established in the competition rules for aircraft appearance. Competitions should be considered “come as you are”. “Come as you are” is defined as no special effort, painting, or additional markings applied to enhance or improve the overall appearance of the aircraft.

A6.4.4. Wing Aircraft: Wing commanders will select one aircraft to be specifically marked. It will be the only aircraft authorized so marked. Exception: Wings that are considered a Composite Wing (two or more weapon systems assigned) and AATC at Tucson ANGB. Highlighting the 2-digit unit designator and radio call numbers is authorized using flat white, black or contrasting grays. Tail and nose art can be applied using flat colors that match the gloss requirements of the original paint scheme. Moving or altering radio call numbers or changing color(s) / camouflage pattern(s) on vertical tail(s) is not authorized.

A6.4.5. Special Mission Aircraft: The ANG has a number of “Special Mission Aircraft” assigned. Several of these units maintain aircraft with high gloss paint systems and markings. These aircraft will be marked IAW T.O. 1-1-8 or specific manufacture/SPD drawings. Additional tail markings; i.e., color stripes, Minuteman logo, State Name, etc., are considered optional, must be approved by the Wing Commander, in writing, and kept on file within the unit. Waxing of high gloss aircraft is not authorized IAW 1-1-691.

A6.4.6. Anniversary Markings: Wings are authorized to apply anniversary marking to their aircraft. Markings may be applied on the vertical tail or forward fuselage only. Anniversary markings must be removed after one year. No extensions or waivers will be accepted.

A6.4.7. Tail marking must be accomplished without moving or altering radio call numbers. Designs must be painted with flat colors, black & white, or contrasting gray colors.

A6.4.8. Forward fuselage markings must not exceed 18 inches for fighter aircraft and 36 inches for large aircraft. Designs may be applied by painting or using vinyl materials in flat colors, flat black or contrasting grays. Criteria for designs must meet the requirements in the Nose Art, paragraph A6.4 and are approved by the Wing Commander. Over coating of radomes is not authorized nor will it be used as part of a nose art scheme.

A6.5. Static Display Aircraft: Static display aircraft located at ANG units and CRTIC Training sites must be maintained IAW AFI 84-103. Wing Commanders will ensure funding is provided annually for up-keep, maintenance, washing and paint touch-up. Appoint an Airpark Manager, in writing, to oversee static display activities. This individual will ensure maintenance records are properly maintained, kept on file with the unit historian, and the Historical Property Agreement with the USAF Museum is updated annually. POC for ANG static display aircraft is NGB-PAI-H, 1411 Jefferson Davis Highway Suite 12000, Arlington, Virginia 22202-3231.

A6.5.1. Repainting of static display aircraft should be accomplished every 5-7 years. Use of Low VOC Mil Spec or Industrial primers and high UV gloss coating is recommended. Work can be accomplished by unit personnel or contracted out. State and local environmental regulations must be met and will vary from state to state.

A6.6. Aircraft Transfers: Units transferring aircraft to another unit or Command must remove the following marking. Exceptions: Aircraft going into AMARC for storage, FMS or disposal.

A6.6.1. Organizational insignias

A6.6.2. Unit designator

A6.6.3. Tail stripe

A6.6.4. Aircrew and crew chief names

A6.6.5. Unit unique markings

A6.6.6. Nose art may be retained if gaining unit agrees.

A6.7. Marking Specifications

Table A6.1. Marking Specifications.

<u>Aircraft</u>	<u>Paragraph</u>
A/O-10	A6.8.1.
E-8(B-707-400)	A6.8.2.
HC/MC-130	A6.8.3
C-130 E-J	A6.8.4.
F-15	A6.8.5.
F-16	A6.8.6.
HH-60	A6.8.7.
C-5	A6.8.8.
C-17	A6.8.9.
KC-135	A6.8.10.
C-21	A6.8.11.
C-27	A6.8.12
F-22, B-2, MQ-1, MQ-9	A6.8.13.
NOTES:	<p>1. The word “Optional” means a local Wing Commander option. Local markings will not be placed on the aircraft during PDM or contractor scuff sand and repaints. Units must apply at home station.</p> <p>2. The use of computer stencil makers, and vinyl material at local units and Depot/Contractors is authorized IAW T.O. 1-1-8. Variations in size, width, length, and spacing of letters/numbers may be different due to the various computer programs available.</p> <p>3. Associate Wings may apply their Command or Squadron emblems on ANG owned aircraft. ANG emblems will always be first. Location and size of these markings will be determined by the owning unit.</p>

A6.7.1. OA/A-10.

Table A6.2. OA/A-10

COMMAND MINUTEMAN INSIGNIA: 18 inches (flat black) **Optional**. TBD by Wing Commander, (tail or fuselage)

ORGANIZATIONAL INSIGNIA: 18 inches (flat decal or colors) **Optional**. Left Side: above panel F-18 and aft of panel F-44. Right side: above panel F-79 and aft of panel F-105. UNIT DESIGNATOR: 12 inches (flat black or contrasting gray) **Optional**. Vertical: Lower edge 3 inches above tail numbers. Horizontal: Centered on vertical stabilizer.

PILOT AND CREW CHIEF NAMES: (flat black) **Optional**. Pilot on left side under windscreen, beginning at FS 118.92. Crew chief under pilot's name. Assistant crew chief under crew chief name.

AIR FORCE OUTSTANDING AWARD: 3 inches by 12 inches (flat decal, contrasting grays or flat black) **Optional**. NOSE NUMBER: 6 inches (flat black). Last three/four digits of tail number on both sides of aircraft nose.

RADIO CALL NUMBERS: 6 Inches (flat black). Location: IAW T.O. 1A10A-23- Detail 75.

TAIL FLASH: If tail flash extends onto rudder area, rudder must be weighed and balanced I.A.W. T.O. 1A-10A-3-1.

A6.7.2. E-8 (B-707-400)

Table A6.3. E-8 (B-707-400)

AMERICAN FLAG: 31.5 inches by 60 inches. Applied on both sides of the vertical stabilizer. The top of the flag is located at Fin Station 210.15 with the forward top corner of each flag on the vertical leading edge seam.

COMMAND & ORGANIZATIONAL INSIGNIA: 18 inches (gloss, multi-color), **Optional** Insignias will be placed on the left side of the aircraft, aft of the fwd crew door in the following order: ANG shield, 116 ACW shield, and ACC shield.

UNIT DESIGNATOR: 36 inches (gloss black) **Optional.** The GA will be placed on both sides of the vertical tail, 24 inches below the American flag. Left designator begins 20 inches in from the leading edge. Right designator ends 20 inches in from the leading edge

RADIO CALL NUMBERS: 12 inches high (gloss black). Bottom of number, 33 inches above WL 303.30, top corner of the first number (left hand side) or last number (right hand side) at the leading edge seam.

PILOT & CREW CHIEF NAMES: 3 inches in height maximum (gloss black) **Optional.** Pilot and co-pilot will be placed on the left side of the aircraft nose under the windows: Crew Chief and Asst Crew Chief will be placed on the right side of the aircraft nose under the windows. MCC and AOT crew names will be posted on the inside of the aircraft. Location TBD by unit.

NOSE NUMBERS: 6 inches (gloss black). **Optional.** Last four digits of tail number, on left and right nose gears doors, 2 inches from bottom of the door and centered between fwd and aft edges. (Tops of charters up with door open)

AIR FORCE OUTSTANDING AWARD: 3 by 12 inches (gloss, multi-color decal), **Optional.** Located on the left side of the aircraft, 4 inches above and centered on the 116 ACW shield.

TAIL STRIPE: 15 inches in width. (Gloss-multi-color), **Optional.** The background is black, (color #17038), 11 inches wide, with two red (color # 11136), 2 inch stripes located on the top and bottom of the black background. The *GEORGLA* will be in Gold Metallic finish (color #17043) and the letters are BOOKMAN BOLD ACCT. A.K. Rev C, with a 15-degree slant (facing aft for both left and right side), 9 inches high with a one inch gap between top and bottom red stripes.

LOCATION: 20 inches below the top of the vertical stabilizer and in a leveled position.

A6.7.3. HC/MC/MP-130

Table A6.4. HC/MC/MP-130

HC Aircraft assigned to the 106, 129 and 176 RQW are now ACC gained, but painted in the AFSOC paint scheme, using AFSOC Drawing #93104893. Paint and markings will be two tone; #36118/dark gray and #36293/light gray. The US Flag are not authorized on MC and MP aircraft. ACC must approve their application on HC aircraft. All other marking will be Wing Commander Options. Maintenance and Operations need to communicate before these options are accomplished to ensure mission integrity is not compromised.

ANG TAIL MARKING: 6 inches (Flat Black) **Optional** Centered on both sides of vertical stabilizer above the tail number.

COMMAND MINUTEMAN INSIGNIA: 30 inches, (contrasting gray) **Optional**. Location TBD (tail or fuselage).

ORGANIZATIONAL INSIGNIA: 30 inches (contrasting gray) **Optional**. Insignia will be placed on the fuselage, the bottom of the insignia will center on WL 190.0. The insignia will be centered on FS 270.0.

PILOT/CREWCHIEF/ASSISTANT Names: (contrasting gray) **Optional**. Size and location determined by the unit. Placing names inside the aircraft will avoid removal and replacement prior to and after deployments.

AIR FORCE OUTSTANDING AWARD: 3 inches by 12 inches (flat decal, contrasting gray). Centered, 3 inches above crew entry door **Optional**.

STATE NAME: 10 inch (contrasting gray) **Optional**. Centered on FS 551.00, 10 inches from main landing gear door hinge point.

ENGINE INLET SCOOPS and TI APU Panels: **Optional**. These areas may be stripped if paint erosion or heat damage is occurring. Submit TAR to C-130 Engineering for disposition.

BLACK EXHAUST TRACKS: **Optional**. Black exhaust tracks may be added to the bottom of the wing and flap areas only. This was approved by C-130 Engineering and AFSOC HQ, as a field level option only. Black exhaust track will not exceed 96" wide.

A6.7.4. C/EC-130 E-J.

A6.7.4.1. Equipment Excellence aircraft assigned to the 176 AW are authorized to use tail marking configuration **AK** in flat black or contrasting gray. (See Attachment 7)

A6.7.4.2. Equipment Excellence EC-130J aircraft assigned to the 193 SOW will be painted and marked IAW LM Drawings M39171002 and M39171003. POC for the EC-130J paint and marking drawings is the 580 ACSG/GFEEA. Other marking listed below will be Wing Commander Options.

A6.7.4.3. High Gloss LC-130 aircraft assigned to the 109th AW will be painted and marked IAW AF Drawing 9144927. Wheeled aircraft will be painted Equipment Excellence, IAW AF Drawings 9144700, 9276080, 9276081, 9276082.

A6.7.4.4. Equipment Excellence C-130J aircraft will be painted and marked IAW AF Drawing 9144700, 9276080, 9276081, 9276082 and specific -23J markings. Some

informational markings called out in the -23J which the C-130 SPD considered “not necessary” may be applied at unit level.

Table A6.5. C/EC-130 E-J

<p>UNITED STATES FLAG: 24 inches X 48 inches (Matte finish). Both sides vertical stabilizer, bottom of flag located 154 inches above horizontal stabilizer with bottom of flag centered horizontally on vertical stabilizer. (Except EC)</p> <p>ANG, TAIL MARKING: 12 inches (flat black). Both sides of vertical stabilizer, top of letters located 10 inches below and centered under flag. (Except EC)</p> <p>VERTICAL STAB TIP STRIPE: Top 30 inches of vertical stabilizer to run horizontally not to exceed 15 inches. Solid color with no other marking allowed. Optional (Except EC)</p> <p>TAIL BAND STRIPES: (flat black) 2-inch upper strip located 10 inches below bottom of ANG; 2 inches lower stripe located 12 inches below bottom of upper stripe. Top horizontal stripe will wrap around leading edge and run to the trailing edge of rudder, not to extend onto the rudder trim tabs; bottom stripe will wrap around the leading edge and run to the trailing edge of the rudder. (See Attachment 7) (Except EC)</p> <p>RADIO CALL NUMBERS: 12 inches (flat black). Both sides of vertical stabilizer, top of numbers located 10 inches below bottom of lower tail band stripe, centered under flag. (See Attachment 7) (Except EC)</p> <p>NOSE CALL NUMBERS: 4 digit, 6 inches (flat black) Optional. Location starting at FS 139 (measurement is for H/J model aircraft, and may vary on older E aircraft) and runs aft. The bottom of numbers is horizontal with the bottom of the lower pilot window WL 200.00 to 198.00.</p> <p>UNIT CALL NUMBERS/LETTERS: 6 inches (flat black) Optional. Top of number/letter is located 6 inches from the bottom of the nose call number, starting at FS 139.</p> <p>AIR FORCE OUTSTANDING AWARD: 3 inches by 12 inches (flat decal, contrasting grays or flat black), centered 3 inches above crew entry door. Optional</p> <p>PILOT/CREW CHIEF/ASSISTANT NAMES: (flat black) Optional. Size and location determined by the unit. (Except EC). Placing names inside the aircraft will avoid removal and replacement prior to or after deployments.</p> <p>COMMAND MINUTEMAN INSIGNIA: 30 inches, (flat black or gray decal) Optional. Both side of vertical stabilizer centered with the flag. The top of the emblem is 10 inches from the bottom of the call number.</p> <p>STATE NAME: 10 inch (flat black), centered on FS 551.00 and 10 inches from main landing gear door hinge point. (Attachment 7)</p> <p>BLACK EXHAUST TRACKS: Optional. C-130 engineering has approved, at field level, the widening of exhaust tracks from 60 inches to 96 inches, on the bottom of the wing and flap area. Application is also extended to the top of the flaps, if desired. SPD approval is on file at NGB/A4MM. NOTE: IAW 1C130A-23CL, use of CBA6 Soil Barrier in the exhaust area is a Command Option. Units are no longer mandated to use this material.</p>
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A6.7.5. F-15.

A6.7.5.1. Hawaii aircraft are authorized to use the PACAF Tail Marking configuration, in flat black on their aircraft. (See Attachment 7)

Table A6.6. F-15

<p>COMMAND MINUTEMAN INSIGNIA: 18 inches (flat black) Optional. Location TBD (tails or fuselage).</p> <p>ORGANIZATIONAL INSIGNIA: 18 inches (flat decal or flat colors) Optional. Vertical: Bottom of insignia on WL 100.0. Horizontal: Forward edge of insignia on FS 458.0.</p> <p>UNIT DESIGNATOR: 24 inches (flat black) Optional. Vertical: Top of letters even with top of rudder. Horizontal: Leading edge of first letter on FS 760.0.</p> <p>PILOT and CREW CHIEFS NAMES: Size TBD by unit. Optional. Pilot name centered below left windscreen frame and crew chief and assistant crew chief names centered below right wind screen frame.</p> <p>AIR FORCE OUTSTANDING AWARD: 3 inches by 12 inches (flat decal, contrasting grays or flat black). Location TBD by each unit. Optional.</p> <p>NOSE NUMBER: 4 inches (flat black). Optional. Last three or four digits of tail number vertically on left and right side of nose gear door.</p> <p>RADIO CALL NUMBER: 15 inches (flat black), location IAW 1F-15A-23, Fig 10-1.</p>

A6.7.6. F-16.

Table A6.7. F-16

<p>COMMAND MINUTEMAN INSIGNIA: 18 inches (flat black). Optional. Location TBD by Wing Commander, (tail or fuselage).</p> <p>ORGANIZATIONAL INSIGNIA: 10 inches (subdued decal or flat colors). Optional. Vertical: Top of insignia 11 inches below fuselage/intake splitter vane. Horizontal: Leading edge 52 inches aft of intake duct lip.</p> <p>UNIT DESIGNATOR: 18 inches (flat black). Optional. Vertical: Bottom of numbers at WL 158.0. Horizontal: Leading edge of first letter on FS 482.07.</p> <p>AIR FORCE OUTSTANDING AWARD: 3 inches by 12 inches (flat decal, contrasting grays or flat black), Location TBD by each unit. Optional.</p> <p>PILOT and CREW CHIEFS NAMES: Size TBD by unit. Optional. Pilot name on left canopy rail and crew chief and assistant crew chief names on right canopy rail.</p> <p>NOSE NUMBER: 4 inches (flat black); last three or four digits of tail number on both sides of nose gear door. Optional</p> <p>RADIO CALL NUMBER: 12 inches (contrasting gray) NOTE: Field units may change call numbers to flat black at home station. Aircraft returning from depot will be painted in contrasting gray IAW 1F-16C-2-00GV-00-1.</p>
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A6.7.7. HH-60.

A6.7.7.1. Aircraft assigned to the 106, 129 and 176 are now ACC gained and will be painted with Mil-PRF-85285 Extended Life Coating, Color # 36118 and marked in Flat Black color # 37078.

Table A6.8. HH-60

COMMAND MINUTEMAN INSIGNIA: 10 inches (flat black). **Optional.** Location TBD by Wing Commander.

ORGANIZATIONAL INSIGNIA: 10 inches (subdued decal or flat colors). **Optional.** Wing: on right cargo door 8 inches below forward window, centered. Squadron: on left cargo door, 8 inches below forward window, centered.

PILOT/AIRCREW/CREW CHIEF NAMES: 3 inches maximum (flat black). **Optional.** Pilot: Right door, 2.5 inches below window, centered. Copilot: Left door, 2.5 inches below window, centered. Crew chief/assistant: Crew chief, right cargo door, 3.1 inches below and centered on forward window. Assistant: Left cargo door, 3.1 inches below and centered on forward window. Placing names inside the aircraft will avoid removal and replacement prior to or after deployments.

AIR FORCE OUTSTANDING AWARD: 3 inches by 12 inches (flat decal, contrasting gray or flat black), Location TBD buy each unit. **Optional.**

A6.7.8. C-5.

Table A6.9. C-5

UNITED STATES FLAG: 24 inches by 48 inches (Matte). Both sides of vertical stabilizer, bottom of flag on WL 626, Top of flag, horizontally centered between the 10 percent chord front beam and the 64 percent rear chord beam.

ANG, TAIL MARKING: 18 inches (flat black). Both sides of vertical stabilizer, top of letters located 12 inches below bottom of flag. Top letters will be horizontally centered between 10 percent chord front beam and the 64 percent rear chord beam.

TAIL BAND STRIPES: (flat black) 2 inch upper stripe located 12 inches below bottom of "ANG"; 2 inches lower stripe located 12 inches below bottom of upper stripe. Top horizontal stripe located 18 inches down from bottom of upper stripe. Stripe will run horizontally from aft edge of the leading edge seam, back to trailing edge of the rudder.

RADIO CALL NUMBERS: 18 inches (flat black). Both sides of vertical stabilizer, top of numbers located 12 inches below bottom of lower stripe. Top of numbers will be horizontally centered between the 10 percent chord front beam and the 64 percent rear chord beam.

LOCAL STATION NUMBERS: 12 inches (flat black). **Optional.** Last 4 digits of aircraft serial number, located on both sides of fuselage, top of numbers on stringer 12 on the left side and stringer 11 on the right of fuselage, forward edge of number 9 inches aft of nose seam.

UNIT IDENTIFIER: 10 inches (flat black). **Optional.** Both sides of fuselage, centered under local station number.

AIR FORCE OUTSTANDING AWARD: 3 inches by 12 inches (flat decal, contrasting grays or flat black), centered 3 inches above crew entry door. **Optional.**

PILOT/CREW CHIEF/ASSISTANT NAMES: (flat black). **Optional.** Names can be located on either side of the fuselage. Size and location determined by the unit. Placing names inside the aircraft will avoid removal and replacement prior to or after deployments.

COMMAND MINUTEMAN INSIGNIA: 34 inches (flat black or gray decal). **Optional.**
Location: Both side of fuselage, top of emblem placed 2 inches below clear view window, aft most portion placed 2 inches forward of window centerline.

STATE NAME: 21inch (flat black), location: Centered on both sides of each main landing gear door.

NATIONAL STAR INSIGNIA OUTLINE: 36 inches (flat black). Both sides of fuselage, centered 59 inches aft of FS 1964 on WL 258.

AIR NATIONAL GUARD: 12 inches (flat black), location: centered on underside of fwd nose cargo door.

A6.7.9. C-17.

Table A6.10. C-17

UNITED STATES FLAG: 24 inches by 48 inches (Matte). Both sides vertical stabilize. Bottom of flag located 42 inches above top edge of the of the upper tail band stripe, with the top forward corner of the flag located 1 inch from the VOR/LOC-2 antenna.

ANG, TAIL MARKING: 18 inches (flat black). Both sides of vertical stabilizer, bottom of letters located 12 inches above top edge of the top tail band stripe and centered on an (invisible) vertical line drawn parallel with vertical stabilizer trailing edge that intersects the center of the flag.

TAIL BAND STRIPES: (flat black) Two 2 inch stripes, top of upper stripe located at vertical stabilizer coordinate ZV 134. Top of lower stripe is located 18 inches below bottom of upper stripe. Stripes run horizontally from aft edge of leading edge seam to trailing edge of rudder.

RADIO CALL NUMBERS: 12 inches (flat black). Both sides of vertical stabilizer, top of numbers located 12 inches below bottom of lower tail band stripe, centered on an invisible vertical line drawn parallel with the vertical stabilizer trailing edge, intersecting center of the flag.

LOCAL STATION NUMBERS: 18 inches (flat black). **Optional.** Last 4 digits of aircraft serial number, located on both sides of the fuselage, centered below the lower aft corner of the down view window, with the top of the numbers on fuselage coordinate Z-192.

UNIT IDENTIFIER: 10 inches (flat black). **Optional.** Both sides of fuselage, centered on the station number, top of numbers 6 inches below the bottom of the station number.

ASSOCIATE UNIT IDENTIFER: 10 inches (flat black). **Optional** Both sides of the fuselage, centered on the unit identifier, top of numbers 6 inches below bottom of the unit designator.

AIR FORCE OUTSTANDING AWARD: 3 inches by 12 inches (flat decal, contrasting grays or flat black), centered 3 inches above crew entry door. **Optional.**

PILOT/CREW CHIEF/ASSISTANT NAMES: (flat black). **Optional.** Names can be located on either side of the fuselage. Size and location determined by the unit. Placing names inside the aircraft will avoid removal and replacement prior to or after deployments.

COMMAND MINUTEMAN INSIGNIA: 34 inches (flat black or gray decal). **Optional.** Both sides of fuselage, most forward edge of emblem located 3 inches aft of fuselage light ring, bottom tip of emblem almost touching longeron L-32, and even with top of crew entry door.

STATE NAME: Size TBD by unit (flat black), centered on both sides of main landing gear wheel well assembly.

NATIONAL STAR INSIGNIA OUTLINE: 30 inches (flat black); both sides of fuselage, centered on centerline of the aft fuselage formation light, with the insignia leading edge located 6 inches aft of the light.

U.S. AIR FORCE MARKING: 24 inches (flat black); both sides of fuselage, located 12 inches aft of fuselage station 27.200 and 35.38 inches above longeron 1-25.

A6.7.10. KC-135.

Table A6.11. KC-135

Aircraft assigned to Hawaii and Alaska authorized tail marking configuration (HH or AK), in flat black, # 37038 on aircraft painted Equipment Excellence, color # 36173.

UNITED STATES FLAG: 21 inches by 40 inches (Matte); both sides vertical stabilizer, bottom of flag on WL 447, centered between stabilizer leading and trailing edges, not to include rudder.

ANG TAIL MARKING: 12 inches (flat black); both sides of vertical stabilizer, centered between stabilizer leading and trailing edges, not including rudder.

TAIL BAND STRIPES: (flat black). Two inch upper strip grounded at WL 568.90, top of the lower 2-inch stripe located 12 inches below the bottom of the upper stripe.

RADIO CALL NUMBERS: 12 inches (flat black); both sides of vertical tail, top of numbers located 12 inches below ANG tail marking, centered between stabilizer leading and trailing edges, not including rudder.

LOCAL STATION NUMBERS: 6 inches (flat black) **Optional**. Last 4 digits of aircraft serial number, both sides of fuselage nose section. Locate according to T.O. 1C-135-8.

UNIT IDENTIFIER: 6 inches (flat black) **Optional**; both sides of fuselage centered 6 inches under station number.

ASSOCIATE UNIT IDENTIFIER: 6 inches (flat black). **Optional** Both sides of the fuselage. Located 6 inches below bottom and centered on the unit designator.

AIR FORCE OUTSTANDING AWARD: 3 inches by 12 inches (flat decal, contrasting grays or flat black) centered 3 inches above crew entry door. **Optional**.

PILOT/CREW CHIEF/ASSISTANT NAMES: (flat black) **Optional**. Names can be located on either side of the fuselage. Size and location determined by the unit. Placing names inside the aircraft will avoid removal and replacement prior to or after deployments.

COMMAND MINUTEMAN INSIGNIA: 34 inches (flat black or gray decal) **Optional**; both sides of fuselage, 16 inches aft of crew entry door, 6 inches below USAF markings.

BOOMELEVATORS: 10 inches (Color # 36622). Highest numeric designator of station assigned centered on the underside of the left rudder and alpha designator (ANG) centered on underside of the right rudder.

A6.7.11. C-21 (Bridge Mission).

Table A6.12. C-21 (Bridge Mission)

UNITED STATES FLAG: 5 inches (Gloss) both sides of vertical stabilizer, 12 inches up from the top surface of the HF Antenna and 15.5 inches forward of the rudder attachment point.

TAIL BAND and STRIPES: 1 inch gloss gold stripes, 8 inch band w/gloss multi-colors, 6 inch gloss lettering. Both sides of the vertical and rudder. Lettering centrally located vertically and horizontally within the tail band parallel to the aircraft centerline. Tail band starts 2 inches below the US flag. Note: If tail band and stripes extends onto rudder area, rudder must be re-weighed and balanced I.A.W TO or aircraft manufacture instructions.

ANG EMBLEM: 12 inches placed on the left side of the forward fuselage, 5 inches below the corner of the windshield and centered between the edge on the entrance door and windshield.

RADIO CALL NUMBERS: 8 inches. Both sides of vertical stabilizer, 9 inches below lower surface of the HF antenna and 15.5 inches forward of the rudder.

PILOT/CREW CHIEF NAMES: 1 inch, gloss black. Pilots/crew chief names left nose landing gear door, 2 inches aft of forward edge.

A6.7.12. C-27J.

Table A6.13. C-27J

UNITED STATES FLAG: 20 inches X 38 inches (Matte finish). Located on both sides vertical stabilizer and placed 10 inches above the top edge of the MAJCOM Designator. Should be horizontally centered between the vertical stabilizer leading edge and the rudder hinge point.

ANG, TAIL MARKING: 12 inches (37038) applied half way (centered) between the bottom and top edges of the vertical stabilizer. It should be horizontally centered between the vertical stabilizer leading edge and the rudder hinge.

TAIL BAND STRIPES: (37038) Two 2-inch stripes, 12 inches apart, running horizontally across the tail and the rudder. The top edge of the top stripe should be 10 inches below the bottom edge of the MAJCOM designator.

RADIO CALL NUMBERS: 10 inches (37038). Both sides of vertical stabilizer, top of numbers located 10 inches below bottom edge of the tail stripe. Numbers should be horizontally centered between the vertical stabilizer leading edge and the rudder hinge point.

NOSE CALL NUMBERS: 4 digits, 6 inches (37038) Optional. Location is below the pilot's window.

UNIT CALL NUMBERS/LETTERS: 6 inches (37038) Optional. Top of number/letter is located 6 inches from the bottom of the nose call number. Location is below the pilot's window.

AIR FORCE OUTSTANDING AWARD: 3 inches by 12 inches (flat decal, contrasting grays or flat black), centered 3 inches above crew entry door. Optional

PILOT/CREW CHIEF/ASSISTANT NAMES: (37038) Optional. Size and location determined by the unit. Placing names inside the aircraft will avoid removal and replacement prior to or after deployments.

COMMAND MINUTEMAN INSIGNIA: 30 inches, (flat black or gray decal) **Optional**. Both side of vertical stabilizer centered with the flag. The top of the emblem is 10 inches from the bottom of the call number.

STATE NAME: 10 inch (37038), Centered on the main landing gear pod horizontally and centered vertically as the APU exhaust will allow. Vertical placement should be symmetrical for both pods. (See Attachment 7 for examples)

A6.7.13. **F-22, B2, MQ-1 & MQ-9:** follow the Marking Specifications listed in ACCI Command Instructions.

Attachment 7 (Added-ANG)**TYPICAL ANG TAIL MARKING CONFIGURATIONS**

A7.1. The following illustrations are provided for units that operate C-130, KC-135, C-5, or C-17 aircraft, which better define standard marking authorized for ANG airlift aircraft that belong to different gaining commands. Special Mission aircraft are exempt from these requirements, and must be marked IAW AF Drawings for their mission. (Arctic, AFSOC, Rescue) Wing Commander options are authorized per Attachment 6.

A7.1.1. ANG Tail Marking Configurations for AMC/AETC Gained Units**A7.1.1.1. C-130 & C-27 ANG Tail Marking Configurations.**

Figure A7.1. C-130 & C-27 Equipment Excellence Gray Tail Scheme and Standard Markings.

**A7.1.1.2. KC-135 ANG Tail Marking Configurations.**

Figure A7.2. KC-135 Equipment Excellence Gray Tail Scheme and Standard Markings.

**A7.1.1.3. C-5, C-17 ANG Tail Marking Configurations.**

Figure A7.3. C-5, C-17 Equipment Excellence Gray Tail Scheme and Standard Markings



A7.1.1.4. State Name Marking Sample. This marking is authorized on all C-130, C-5, C-17 & C-27 aircraft. Length, width and height will vary with each aircraft.

Figure A7.4. State Name Marking Sample



A7.1.2. Typical ANG Tail Marking Configurations for PACAF gained (Hawaii or Alaska)

A7.1.2.1. Typical Tail Marking Configuration

Figure A7.5. KC-135 Equipment Excellence Tail Scheme.



A7.1.2.2. Optional Tail Marking Configuration

Figure A7.6. Optional tail marking (Example Only)

A7.2. F-16, F-15 A-10 and F-22 aircraft radio call numbers must not be moved or altered when a 2-digit Unit Designator is applied or shadowed on Wing designated aircraft. Two tone camouflage patterns will not be altered with SPD approval. This rule also applies when Tail Art is applied.

A7.3. Non-standard markings must be approved by the Wing Commander, in writing and kept on file at the unit.

Figure A7.7. Coating Grid Check Checksheet

COATING GRID CHECK

STRIP
(>15 MILS)

SCUFF
(<15 MILS)

STRIP LIP? YES
NO

INTAKE NOTES

INSPECTED BY:

DATE AIRCRAFT NO