BY ORDER OF THE COMMANDER
AIR FORCE SPACE COMMAND

AIR FORCE INSTRUCTION 32-1054

AIR FORCE SPACE COMMAND
Supplement 1

1 JUNE 1998

Civil Engineering

CORROSION CONTROL

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Supersedes AFI32-1054AFSPC1, 2 Jun 97
Pages: 14
Distribution: F

This supplement implements and extends the guidance of Air Force Instruction (AFI) 32-1054, *Corrosion Control*. The AFI is published word-for-word without editorial review. Air Force Space Command (AFSPC) supplemental material is indicated in bold face. This supplement describes AFSPC's procedures for use in conjunction with the basic AFI. It applies to HQ AFSPC, its subordinate units, and to all organizations supported by Headquarters Civil Engineering Directorate (CE), 150 Vandenberg Street, Suite 1105, Peterson AFB CO 80914-4150. It establishes additional responsibilities and requirements for the Air Force Space Command (AFSPC) Corrosion Control Program. Additionally, AFSPCI21-105, *Air Force Space Command Corrosion Program*, explains the program for preventing, detecting, and treating corrosion on aircraft, missiles, spacelift vehicles, communications-electronics equipment and Aerospace Ground Equipment (AGE). This supplement does not apply to Air National Guard or Air Force Reserve Command units. Upon receipt of this integrated supplement discard the Air Force basic publication.

SUMMARY OF REVISIONS

The revision of this publication is to meet the format standards required by Air Force, no content material has changed. Some required format changes have been made to allow for the conversion process.

3.2.1. Corrosion control responsibilities at the Major Command are shared: HQ AFSPC/CECO is responsible for policy and guidance. HQ AFSPC CEF/CEO is responsible for execution. An individual from each office is appointed to perform their assigned duties in the Command Corrosion Control Program. The Major Command will send names of the corrosion control engineers, telephone/FAX numbers, E-mail addresses and regular mail addresses in a message of introduction to all Base Civil Engineers in the Command.

3.2.2.1. (Added) The Command Corrosion Control Engineers will assist in obtaining needed training for corrosion control personnel within the Command. Training shall be investigated through private industry as well as government sources.

3.2.2.2. (Added) The Command Corrosion Control Engineers will periodically visit installations within the Command to evaluate the effectiveness of corrosion control programs, adequacy of training, and provide necessary guidance.

3.2.2.3. (Added) The Command Corrosion Control Engineers will ensure all installations within the Command develop, establish, and maintain an effective, comprehensive corrosion control program which includes annual base-wide surveys.

3.2.3.1. (Added) The Command Corrosion Control Engineers and Environmental Division (CEV) will ensure the Command Corrosion Control Program includes sound pollution prevention practices.

3.4.1.1. (Added) Designers shall take into account project siting before beginning design. Project Siting can be the most important corrosion consideration during a project's definition and design. Metallic structures and components located at low humidity bases that are away from the ocean require less maintenance than at those bases adjacent to the ocean. If a large metallic structure is mandated, a high, dry siting should be considered during the initial project definition phase.

3.4.1.2. (Added) Structures that must be located on ocean adjacent installations can greatly decrease corrosion maintenance costs by being located as far from the ocean as possible. Locating the structure on a hill 500 feet or more above the ocean or on the opposite side of the base from the ocean decreases but does not eliminate corrosion related material failures.

3.4.1.3. (Added) When neither of the above considerations is possible, extra corrosion control systems, special protective coatings, and additional care in material selection are necessary during the design process.

3.4.1.4. (Added) Another way of reducing salt air infiltration into electrical equipment, mechanical rooms, and items of mechanical equipment is to use sacrificial air filtration systems to remove the salt and humidity from ventilation air. The filters are much cheaper to replace than repairing or replacing the equipment they protect from corrosive atmospheres. An example of the filtration system method is the use of two-inch thick, close-ferrous metal air filters which are sprayed with an adhesive oil to capture the salt particles from the incoming air.

3.4.1.5. (Added) Utilization of Controlled Atmospheres. Some AFSPC assets located in extremely corrosive atmospheres are most economically protected by dehumidifying the structure with air conditioning. Past examples have been mechanical rooms, standby generator rooms, and hazardous material storage rooms where metal containers must be used. The installation commander is hereby given the authority to approve air conditioning of non-occupied buildings for corrosion control purposes on a case by case basis, dependent on mission criticality and cost effectiveness.

3.4.1.6. (Added) Construction Project Design. Project books, Requirements and Management Plans (RAMP), drawings, and specifications for new construction projects must include corrosion control considerations and "lessons learned" at the installation. The drawings and specifications must be reviewed and approved by the base corrosion control engineer.

3.5.1.1. (Added) Base Civil Engineers will develop and maintain an effective corrosion control program at all installations where Air Force Civil Engineering has responsibility for property, materials, supplies, and equipment. The Base Civil Engineer will appoint a single focal point for corrosion control. The name, office symbol, and telephone/FAX number will be forwarded to the MAJCOM Corrosion Control Engineers annually, by 1 November of each year.

3.5.2.1. (Added) Training Requirements. Annual training of personnel in corrosion control is both essential and required for an effective corrosion control program. The installation Base Civil Engineer ensures all personnel (including design personnel) dealing with corrosion control are adequately trained. Training should include course, conference and workshop attendance as well as on-the-job training.

3.5.2.2. (Added) NACE Conference. Attendance at the National Association of Corrosion Engineers (NACE) annual conference or the annual NACE/Military Tri-Services Corrosion Control Seminar can be a good source of annual training. For additional information on the NACE conferences or other corrosion control courses, contact the MAJCOM Corrosion Control Engineers.

3.5.3. Installations will submit all report inputs to HQ AFSPC CEF/CEO, 1520 East Willamette Avenue, Colorado Springs CO 80909-4554, in written form.

3.5.4.1. (Added) Attachment 2 is a checklist of minimum essential corrosion prevention tasks to be performed at specified intervals and lists sources of guidance for performing these tasks. In addition to the items listed in the checklist, the corrosion control program should also contain provision for cross-checking corrosion control decisions during site selection, project design, project location, material selection, construction quality control, and installation operations and maintenance.

3.5.4.2. (Added) Accurate as-built drawings showing the location of all cathodic protection systems must be maintained. The cathodic protection system master plan must show and describe all installed rectifiers, ground beds, and all anodes. The installation corrosion control engineer is responsible for ensuring cathodic protection maps are updated to show modifications made on the systems. The location of neighboring structures and test stations should also be indicated.

3.5.4.3. (Added) Protective Coatings. The installation corrosion control engineer will monitor all phases of projects to be reviewed for adequacy in protecting against corrosion. The corrosion control engineer is also responsible for ensuring all facilities are recoated or repaired to prevent corrosion and that recoating or coating repair is properly done. The corrosion engineer must ensure the paint shop maintains proper coating performance documentation on all facilities painted. Additional guidance on coating selection is contained in Attachment 4. Protective coatings on all facilities with exterior metal must be inspected annually to determine if corrosion is occurring and recoated if necessary.

4.1.3.5. The Resource Conservation and Recovery Act also outlines requirements for cathodic protection of underground storage tanks (UST). These requirements are specifically found in CFR Part 280.31 and 280.33.

4.1.3.8. (Added) State and Local Requirements. States and local jurisdictions may also have corrosion control requirements for underground storage tanks and associated record keeping and reporting. They may also have requirements for air quality and VOC emission limitations more stringent than federal requirements.

5.1.1. (Added) General. A successful corrosion control program is highly dependent on proper implementation of required corrosion control measures. Records must be maintained by shops to determine requirements and ensure they are being met.

5.1.2. (Added) Personnel Files. A current roster of personnel dealing in corrosion control must be kept by the base corrosion control engineer. Individual's training status and training program attendance should also be on file.

5.1.3. (Added) Equipment File. Corrosion control monitoring equipment, with operational status, should be listed along with the following information:

5.1.3.1. Manufacturer's data on installed equipment. This will include the dates when the equipment, cathodic protection or corrosion control material was used or installed. Special attention should be paid to the shelf life of material used in corrosion control.

5.1.3.2. Lists of repair parts.

5.1.3.3. Names and addresses of replacement parts sources.

5.1.3.4. Repair, operating, and maintenance instructions.

5.1.3.5. Calibration requirements and last time calibrated.

5.1.4. (Added) System Information. File folders should be maintained on all Real Property (RP) and Real Property Installed Equipment (RPIE) installation structures and assets subject to corrosion. The files for these facilities should include locations of updated shop and as-built drawings, cathodic protection program records, corrosion failure reports, and annual visual inspection reports. The list of facilities subject to corrosion should include, but not be limited to the following:

5.1.4.1. Water tanks.

5.1.4.2. Steel towers.

5.1.4.3. Underground pipe systems.

5.1.4.4. Fences and security control structures.

5.1.4.5. Buildings and real property equipment.

5.1.4.6. Harbor and dock facilities.

5.1.4.7. Hazardous material storage facilities.

5.1.4.8. Water treatment plants (potable, industrial, and wastewater).

5.1.4.9. Fuel storage facilities.

5.1.4.10. Bridges, signs, and other road and railroad facilities.

5.1.4.11. Communication towers.

5.1.4.12. Underground storage tanks.

5.1.5. (Added) Cathodic Protection Records. Cathodic protection program record requirements are detailed in AFMAN85-5, Chapters 8 and 9.

5.1.5.1. Underground storage tank (UST) system owners and operators must maintain records IAW 40 CFR parts 280.31 through parts 280.34.

5.1.6. (Added) Cathodic Protection Annual Performance Booklet. Basic requirements for the Cathodic Protection Annual Performance Booklet are described in AFMAN85-5, Chapter 8, paragraph 6. The review copy of the booklet will be sent annually to the Command Corrosion Control Engineer in CEF/CEO. It may be soft cover and staple bound.

5.1.7. (Added) Failure Records. Records of corrosion damage and facility failures must be maintained as described below:

5.1.7.1. For liquid containers and pipe lines, AF Form 1687, **Leak/Failure Data Record**, must be completed and placed in the facility jacket folder after each failure investigation. One copy must also be included in the "Cathodic Protection Annual Performance Booklet". The location of the leak or failure should be indicated on a base layout map. Corrective maintenance, repair, and applied corrosion control measures with costs should also be recorded and placed in the facility folder.

5.1.7.2. For building and structural corrosion failures, the following information should be completed and placed in a facility folder:

5.1.7.2.1. A short description of the failure.

5.1.7.2.2. The date the failure was first observed.

5.1.7.2.3. The method and cost of repair.

5.1.7.2.4. The cause of the corrosion failure, such as dissimilar metals, corrosive atmosphere, protective coating failure, or other.

5.1.7.2.5. Photos of the failure and repair. Annotate date taken and facility number.

5.1.7.3. A copy of the above failure information items will also be recorded in the "Cathodic Protection Annual Performance Booklet".

5.1.8. (Added) A cathodic protection performance survey must be conducted annually for each facility by the base corrosion control engineer, the cathodic protection technician or by contract. Systems not performing at required protection levels must be corrected. Enter operational data and test results in appropriate logs and on AF Form 1688, **Annual Cathodic Protection Performance Survey**.

5.2.1. (Added) Distribution maps should be maintained for all potable and waste water systems by the base Water and Wastewater shops. The water and waste water shops should perform raw water analysis and record complete data on water sources, consumption and potable water/waste water treatment according to AFR91-26 and AFMAN91-32.

5.2.2. (Added) Boiler water and cooling water treatment records must be maintained by the base Heating, Ventilating and Air Conditioning (HVAC) shop. Data is required on internal treatment, external treatment, and make-up water as a percentage of boiler output. Cooling towers must be checked IAW AFP91-35 for corrosion, algae, and scale build up. The cycles of concentration will be calculated and maintained according to survey recommendations. The base corrosion engineer must ensure the necessary corrosion tests and system examinations are performed according to Attachment 2. The base corrosion control engineer is also responsible for making sure treatment equipment is adequate and working.

5.2.3. (Added) Corrosion Failures. All leaks and corrosion failures must be investigated by the installation corrosion control engineer and cathodic protection technician. The cause of the failure must be determined and corrective action taken to prevent recurrence. Complete leak and failure data should be recorded on AF Form 1687, **Leak/Failure Data Record**. Installation layout maps should be used to record each location where an underground leak has occurred. The base corrosion control engineer can then analyze the data for patterns which indicate major problems.

Attachment 2 (ADDED)
CORROSION CONTROL PROGRAM CHECKLIST

Table 2.1. (Added) Checklist.

ITEM	AF FORM	GUIDANCE	FREQUENCY
CATHODIC PROTECTION			
Annual Cathodic Protection Performance Survey	1688	AFMAN85-5, Chap 9	Annually
Select check points for monthly system readings	491	AFMAN85-5, Atchs 2, 18	Annually
Determine required rectifier currents.		AFMAN85-5, para 9-3	Annually
Check dielectric insulation	1688	AFMAN85-5, para 9-5	Annually
Physically inspect anodes in water tanks and measure structure to water potentials	1689	AFMAN85-5, para 9-14	Annually
Update Cathodic Protection Program Record		AFMAN85-5, Atch 18	Annually (Note 1)
Updaate Corrosion Protection Performance Booklet and submit to major command		AFMAN85-5, Atch 17	Annually
Initiate changes and improvements where needed through Maintenance Action Sheets and Annual Work Plan	332	AFI32-1031	As Required
Measure structure to soil potentials at each building service pipe line and at points over the pipe closet to and farthest from the anodes		AFMAN85-5, Atch 18	Annually
IMPRESSED CURRENT SYSTEMS			
Measure structure to soil potential at 4 test points for each system	491	AFMAN85-5, Atch 18	Monthly

Adjust rectifier voltages to maintain required potentials at test pointspo	491	AFMAN85-5, Atch 18	Monthly
Check rectifiers for proper operation (overheating, etc.)		AFMAN85-5, para 5-3 and Atch 12	Monthly
Test rectifier voltmeters and ammeters		AFMAN85-5, Atch 18	Annually
Check current output of each anode at deep anode beds	1688	AFMAN85-5, Chap 9	Annually
Take voltage and current readings on all rectifiers	491	AFMAN85-5, para 5-3	Monthly
Measure structure to soil potential at building service lines, and at 1000 foot pipe intervals		AFMAN85-5, paras 8-7d and 9-2 Atch 18	Annually
SACRIFICIAL ANODE SYSTEMS			
Measure structure to soil potential, current output, and anode to soil potential. Measurements should be taken at service risers and at points over the pipe midway between anodes	1656	AFMAN85-5, paras 4-6, 7 and Atchs 4, 5, 18	Semiannually
Measure structure to soil potential on each side of all dielectric insulators		AFMAN85-5, para 9-5	Annually
WATER TREATMENT			
Water Treatment		Previously found in AFP91-41 (Rescinded)	
Boiler Water		Previously found in AFMAN85-12 (Rescinded)	
Record internal treatment Chemicals, etc	1459		Daily
Record external treatment deaerators, softeners, decarbonators	1459		Daily (Note 1)

Test make-up water, quantity and quality		Monthly
Check for leaks in steam valves, flanges, and unions in boiler plant		Daily
Test heat exchanger for leaks		Monthly
Check pressure and temperature of deaerating heater		Daily
Determine conductivity of return condensate		Daily (Note 2)
Have condensate corrosion tests performed		Monthly
Test ion exchanger output quality		Daily (Note 1)
Check mechanical rooms with hot water heat exchangers for signs of corrosion problems		Semiannual
Check all tanks		Annually
Check piping system, boiler plant		Daily

PROTECTIVE COATINGS

Protective Coatings	Previously found in AFMAN85-3 (Rescinded)	
Update painting records		As Needed
Drain (as appropriate) clean and inspect interior of water storage tanks		Annually

Inspect coatings on all facilities with exterior corrosive metals, update Corrosion Protection Performance Booklet and put in work orders		AFMAN85-5	Annually
LEAK/CORROSION FAILURE DATE			
Inspect leaks and failures	1687	AFMAN85-5, para 8-6, 8-3 and Atch 6	As they occur
Update base layout map to pinpoint leaks		AFMAN85-5, para 8-6K	As leaks are found
UNDERGOUND STORATE TANKS (UST) ONLY			
All UST cathodic protection systems must be tested		40 CFR, Ch 1 Part 280.31	Within 6 months of installation at at least every 3 years thereafter
UST systems with impressed current cathodic protection		40 CFR , Part 280.31	Everey 60 days to ensure proper system operation
UST repairs		40 CFR, Part 280.33	Cathodic protection system must be tested within 6 months after repair

Notes:1. Perform more often, if required.
2. Hourly for large plants.

Attachment 3 (Added)

MATERIAL SELECTION FOR CORROSION CONTROL

A3.1. Selecting non-corrosive construction materials during the design process greatly reduces maintenance costs during the life-cycle of facilities located in corrosive environments. The following is a partial list of construction components and materials recommended for maximum corrosion prevention.

A3.2. Beams and Columns. Consideration should be given to using hot dipped galvanized steel or painted hot dipped galvanized steel structural members. Generally, adding protective coatings to galvanized metal will extend the expected service life of the item by one and one half times the combination life of the two systems. For example: If an item's galvanized coat is expected to last 40 years and it is painted with a paint system that normally lasts 10 years, the expected service life of the duplex system would be 1.5 X 50 or 75 years.

NOTES:

1. The paint film extends the life of the galvanized coating by protecting the zinc layers while the underlying zinc coating tends to prolong the life of the paint by preventing underlying corrosion from developing. The paint coatings also act to protect the zinc coating from scratches and cuts through to the base metal.

2. See Attachment 4 for recommended paint coatings on non-galvanized structural steel in corrosive environments.

A3.3. Concrete. Concrete, brick, and concrete block are preferred construction materials in corrosive environments. However, in areas where seismic activity is a concern special care must be taken in design to allow the structures to withstand ground movement. Concrete rebar in corrosive environments should be galvanized and covered with at least 2.5 inches of sound, chloride-free concrete. See Attachment 4 for recommended exterior concrete coatings in salty environments.

A3.4. Condensers (Air Cooled). Coils for air-cooled condensers located in corrosive environments should be fabricated with copper alloy tubes and have copper alloy fins. Copper alloys 687, 706, 710, and 715 are preferred for condenser tubing and fins in salt air environments. Aluminum fins with an epoxy phenolic coating are acceptable. Intake system cooling air should be suitably filtered. See International Service Bulletin 68-8, "Sacrificial Condenser Filters", Carrier Air Conditioning Company, Syracuse, New York, May 1968, for a recommended filter method. Consider the use of plastic or fiberglass fans for condensers and air handlers, where large quantities of outside makeup air are involved.

A3.5. Doors and Frames. Shop painted galvanized steel or fiberglass doors and frames should be used in corrosive environments. The hardware should be Type 304 stainless steel.

A3.6. Electric Conduit. Stainless steel or anodized aluminum alloys may be used for electrical conduit in above ground applications. Ultraviolet resistant fiberglass may also be specified.

A3.7. Exterior Electrical Boxes. Electrical boxes and other enclosures should be placed within the facilities they service for both aesthetic and anti-corrosion purposes. When electrical boxes and enclosures must be placed at exterior locations in corrosive environments, they should be fabricated from fiberglass which has a proven resistance to ultraviolet light degradation. Conduits associated with these enclosures should also be specified to be ultraviolet light-resistant non-metallic. Alternatively, stainless steel or PVC coated conduits and fittings can be used above ground. Unistrut should not be used to attach boxes, conduit or other components to structural steel in corrosive environments.

A3.8. Fences. All posts, chain link fencing, gates, and accessories should be galvanized steel with factory applied vinyl coatings in coastal areas. See "PVC-Coated Posts and Accessories for Chain-Link Fences", Tech data Sheet No 76-16, Civil Engineering Laboratory, Naval Construction Battalion Center, Port Hueneme, Ca. Sept. 1976 for additional data. In cases where the fence must be topped, stainless-steel, saw-tooth tape should be used.

A3.8.1. In less corrosive environments away from coastal areas, fence materials can be galvanized without vinyl coatings.

A3.8.2. In cases where security is less a factor, wood fence materials, fences from recycled materials, and concrete wall fences should be considered for both aesthetic and low maintenance purposes.

A3.9. Guardrails and Handrails. Guardrails, handrails, and their supports and fasteners should be fabricated from galvanized steel. Similarly, walkways and gratings should be galvanized steel or aluminized steel.

A3.10. Gutters and Downspouts. Gutters and downspouts should be fabricated from anodized aluminum alloy or soldered copper.

A3.11. Guy Wires. Aluminum-coated steel or Type 304 stainless steel wire rope should be used for the antenna support systems. If aluminum coated steel wire rope is used, it is important that the hardware in contact with the rope is also aluminum coated steel.

A3.12. High Voltage Electric Wire & Secondary Voltage Wire. Wire will be installed in accordance with the National Electric Code.

A3.13. Louvers. All louvers should be fabricated from fiberglass, anodized aluminum-alloy, or shop coated galvanized steel.

A3.14. Purlins. Purlins should be fabricated from hot dipped galvanized steel.

A3.15. Roofs:

A3.15.1. Avoid the use of exposed metal panels where possible in coastal areas. Built-up, single-ply, shingle, or tile roofs are preferred. Where metal panels are to be used for aesthetic purposes, the use of a thicker gage such as 18 gage in place of the standard 24-gage is needed. The use of thicker metal for roofing panels does not obviate the need for maintenance. Rather, it permits additional maintenance cycles for abrasive cleaning.

A3.15.2. If exposed metal roofs must be used, they should be fabricated from aluminized-steel (Type 2) that is factory coated with an oven-baked fluoropolymer enamel such as Duranar 200. The roof panels should be "standing seam" interlocking, and secured to the purlins with a concealed structural fastening system in order to preclude moisture and dirt entrapment. The "standing seams" should have a factory-applied, non-hardening sealant and should be continuously locked or crimped together by mechanical means during erection. Roof panels with lap-type, longitudinal joints and exposed structural fasteners are not acceptable. The concealed clips or backing devices used to fasten the roof panels to the purlins or secondary support members should be fabricated from aluminized steel. Through penetration of the roofing surface by exposed fasteners should be stainless steel or aluminum-alloy screws, bolts, or rivets with weather seal washers. Roof panel cross-sections should be flat and free of cross ribbing in order to eliminate the need for closure plugs at the eaves, ridge, and roof penetrations. In humid, salty environments, use stainless steel or copper roof metal gravel stops, fascia and counterflashing.

A3.16. Steels:

A3.16.1. Uncoated carbon steels are highly susceptible to corrosion in aggressive environments and their use should be avoided to the highest degree possible in construction. Various coating systems can be used to extend the life of carbon steels but it should be remembered that all coatings contain holidays and imperfections. As a result, recoating and general maintenance must be accomplished at regular intervals to prevent coating failure and the start of corrosion (see Attachment 4).

A3.16.2. Naturally weathering steels such as ASTM A588 steels should not be considered for structural applications in coastal areas.

A3.16.3. Aluminized steels and galvanized steels should be used in applications where strength, toughness, high melting point, and low cost are factors.

A3.17. Ventilators. Ventilators and associated components should be fabricated from an appropriate anodized aluminum alloy, aluminized steel, galvanized steel, or fiberglass.

A3.18. Wall Panels. Steel wall panels are not acceptable except in very high and dry climates. Aluminized steel is not preferred. Consider fiberglass, brick, concrete, concrete block, stucco, and other non-corrosive materials.

A3.19. Weldments. Weldments in corrosive environments should be low-carbon grades of austenitic stainless steel (Types 316L and 304L) and appropriate filler metals.

A3.20. Windows. Windows and associated components should be fabricated from 6060 aluminum alloy. Where aluminum-alloy or aluminized steel windows are in direct contact with mortar or concrete which could become wet, the contacting surfaces, of the aluminum or aluminized steel should be coated with a factory-applied, clear methacrylate lacquer in order to prevent aluminum corrosion by the alkaline environment.

A3.21. Wire Rope. Aluminized steel wire rope or type 304 stainless steel wire rope should be used.

A3.22. Plastics. Plastics may be used, if technically and economically feasible, with the approval of the local corrosion control engineer.

Attachment 4 (Added)

PROTECTIVE COATINGS SELECTION FOR CORROSIVE ENVIRONMENTS

A4.1. General. Coating technology is in a period of enormous change due to environmental requirements affecting both preparation and painting. The regulations impact both paint application and the disposal of waste materials developed during surface preparation and the painting process. To comply with these regulations in a cost effective and professional manner, a fully trained manager, knowledgeable in all aspects of corrosion control may be required. For larger installations, an alternative method is to appoint one engineer to manage the protective coating program, one engineer to manage the cathodic protection program, and a third engineer to manage the water treatment program. All personnel must receive annual training to maintain currency on rapidly changing environmental and technical requirements as required by AFI32-1054.

A4.1.1. Surface Preparation. Surfaces should be painted as soon as practicable after abrasive blasting and in any case before exposure to rain, fog, or the appearance of rust bloom. Additionally, consideration should be given to the use of pressure water cleaning at a minimum 400 psi before abrasive blasting of ferrous surfaces in exterior coastal areas. Pressure water cleaning before painting reduces or eliminates soluble salt contamination prior to painting and greatly improves coating performance. Dry abrasive blasting alone will not remove salt contaminants. A test kit should be used to test for soluble salt contamination prior to painting in coastal areas.

A4.1.2. Painting Cycles and Paint Selection. The objective in facility management is not necessarily to maintain a painting cycle of 3 to 5 years. It is to properly protect that facility over its life at the lowest life-cycle cost. Since surface preparation and painting are labor-cost intensive, the least expensive paint system for long time frames is most often a high performance coating with a long service life. The coatings recommended herein are of that nature where possible.

A4.2. Recommendations. Protective coating recommendations for various surfaces of items of equipment and facilities at AF Space Command installations are as follows.

A4.2.1. Concrete and Masonry Surfaces, Exterior. Integral colored concrete masonry units are preferred over exterior concrete painting. If painting must be done, coat with a "breathing-type" coating such as poly-vinyl acetate latex. Alternatively, apply two coats of latex TT-P-1510 for semigloss or TT-P-19 for flat. Water blast cleaning before painting is recommended.

A4.2.2. Exposed Concrete and Masonry Surfaces, Interior. Coat with impermeable coating to serve as vapor barrier.

A4.2.3. Exposed Structural Steel. Two coats of aliphatic urethane over one coat of zinc rich primer (use an epoxy mid coat between the primer and first urethane coat) are recommended for exposed structural steel in areas near cooling towers and sewage treatment plants where chemicals are injected into the water. Encased shop painting may be required in cases where VOC limits prohibit the use of aliphatic urethane or zinc primer in exterior applications. KSC-STD-C-0001; Protective Coating of Carbon Steel, Stainless Steel, and Aluminum on Launch Structures and Ground Support Equipment; criteria may be used where VOC limits permit.

A4.2.4. Steel Structure Spot Recoating. Mechanically clean rusted areas (SSPC SP-2,3), apply one coat of alkyd TT-P-664 at 1.5 Mils dft and 1 coat each of Mil-P-28577 and 28578 each at 1 Mil Dry Film Thickness (DFT). The KSC-STD-C-0001 above also applies.

A4.2.5. Tank Exteriors and Other Associated Steel Surfaces. After abrasive blasting to an SSPC-SP10 (Near White Blast) finish, recoat with one coat of DOD-P-24441 Formula 150, one coat of DOD-P-24441 Formula 151, and one coat of MIL-C-85285. Film thickness shall be as per manufacturers recommendations. KSC-STD-C-0001 also applies.

A4.2.6. Tank Interiors, Potable Water. Reline tank interiors by abrasive blasting to Steel Structures Painting Council Surface Preparation 10 (near White Blast) and application of one coat of DOD-P-24441 Formula 150 primer, one coat of DOD-P-24441 Formula 156, and one coat DOD-P-24441 Formula 152. Film thickness shall be as per manufacturers recommendations.

NOTE:

These products are approved for use in potable water tanks and are available in VOC conforming formulations.

A4.2.7. Wood Surfaces. Sand and paint with one coat of latex paint (TT-P-001984) and two topcoats of latex paint (TT-P-1510 for semigloss and TT-P-19 for flat).

A4.2.8. Lead, Chromium, and Mercury Paints. Do not use paints containing lead, chromium pigments, or mercurial biocides.

A4.2.9. AFI32-7080, Pollution Prevention Program, paragraph 3.5. Affirmative Procurement, promotes the purchase of recycled-content products. Currently, latex paint is on the EPA list of proposed affirmative procurement products. GSA has NSNs for recycled latex paint that meets the same specifications as virgin paint and they are to be used as per AFI32-7080. The NSNs for recycled paint can be found in GSA's "Environmental Products Guide" and DLA's "Environmentally Preferred Product Catalog." Locally developed statements of work are to require the use of recycled paint as per AFI32-7080.

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