BY ORDER OF THE COMMANDER
MCCONNELL AIR FORCE BASE (AMC)

MCCONNELL AIR FORCE BASE
INSTRUCTION 21-106

17 MAY 2022

Maintenance

SEVERE WEATHER PROCEDURES

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This instruction implements AFPD 21-1 *Maintenance of Military Materiel*, *DAFMAN 91-203 Air Force Occupational Safety, fire, and health Standards.* It establishes procedures to ensure the protection of aircraft, personnel, and facilities from severe weather. This instruction is applicable to all aircraft maintenance activities, including Air Force Reserves. All supervisors will ensure familiarization and compliance with these procedures. Ensure that all records created as a result of processes prescribed in this publication are maintained In Accordance With (IAW) Air Force Manual (AFMAN) 33-363, *Management of Records*, and disposed of IAW with the Air Force Records Information Management System (AFRIMS) located at **https://www.my.af.mil/gcss-af61a/afrims/afrims/**. 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*; route AF Form 847s from the field through the appropriate functional's chain of command.

1. General Procedures.

1.1. **The 22d Maintenance Group, Maintenance Operations (MXO) Maintenance Operations Center (MOC) will broadcast pertinent weather information on all radio nets as soon as possible after notification.** In addition, the MOC will notify the 22d Maintenance Group Commander or Deputy Commander (22 MXG/CC or 22 MXG/CD), 931st Maintenance Group Commander or Deputy Commander (931 MXG/CC or 931 MXG/CD), Maintenance Group Quality Assurance (MXG/QA), Aircraft Maintenance Squadron (AMXS), Transient Alert, Maintenance Squadron (MXS), 22d Logistics Readiness Squadron, (22 LRS), Petroleum Oil Lubrication (22 LRS/POL) and 22d Civil Engineer Squadron (22 CES) when a weather warning/advisory is received. Requests for weather forecasts will be accepted only from expediters/shop chiefs or higher.

1.2. **AMXS and MXS Production Superintendents will use current weather information, this instruction, applicable tech data and their on-scene assessment to determine the proper actions to implement.** On-scene assessment is especially important when there is lightning or rapidly changing weather conditions.

1.3. **Actions should be initiated according to the weather forecasted.** For example, if 45-knot winds are expected, start preparation given in **paragraph 4.2** If severe weather arrives before required actions have been completed, the safety of personnel versus the protection of resources will be considered prior to further action.

1.4. **MDS specific items are identified by type (i.** e. KC-135 or KC-46) throughout this instruction.

2. Weather Warning.

2.1. **A weather warning is issued when weather condition exists that pose an immediate hazard to aircraft, resources or personnel.**

3. Weather Watch.

3.1. **A weather watch is issued when the potential exists for weather conditions that pose a threat to aircraft, resources or personnel.** Watches normally precede a weather warning.

3.2. **The MXS Production Superintendent (Red 5) and MOC will ensure that the MXS fuel shop is notified of all-weather advisories.**

3.3. **The Fuel Systems supervisor shall initiate action to ensure operations are suspended by the time the severe weather is within 10 miles for KC-46 aircraft and 5 nautical miles for KC-135 aircraft.**

4. Conditions and Specific Procedures.

4.1. **Winds or gusts from 25 to 34 knots:**

4.1.1. Loose equipment secured.

4.1.2. The Pro Super will ensure the KC-135R radome stand is removed from the mass parking area.

4.1.3. Secure aircraft including all doors and panels.

4.1.4. Personnel will not use high-reach or de-icer baskets for de-icing or any other maintenance unless otherwise approved by the MXG/CC.

4.1.5. All non-essential stands and support equipment will be removed from vicinity of aircraft and hangars.

4.1.5.1. Exception: B7 stand utilized for KC-46 entry when not in use will be lowered and moved to the AGE box location at the aircraft parking spot, and have all locking devices engaged.

4.1.6. **KC-135.** Two personnel will accomplish opening and closing the keel beam. The keel beam door safety lock will be installed when the door is open except to remove or install cargo strut (tail stand). Keel beam doors will be closed during winds gusting at/or above 25 knots unless required to facilitate maintenance actions and will be approved by the on duty production superintendent. In these cases, the opened door will be held open with the door rod.

4.1.7. Ropes and harnesses will be utilized during these wind conditions.

4.1.8. **KC-46.** Ensure Airplane Parking in High winds task (34 knots or higher) is completed per -10 series technical order.

4.2. **Wind or gusts 35 to 64 knots:**

4.2.1. All actions for lesser winds completed.

4.2.2. Cargo door closed unless mission requires the door to be open.

4.2.3. The MOC, in coordination with production superintendents, determines movement and hangar occupancy.

4.2.3.1. When severe weather threatens (lightning within 10 miles or winds exceeding 34 knots), MOC personnel will notify AMXS/MXS production superintendent, who will ensure their respective hangar doors are closed.

4.2.4. Open fuel system maintenance will be suspended when winds reach 30 knots due to potential static build-up from wind on exposed tail surface (i.e., aircraft not fully enclosed in a hanger).

4.2.5. Personnel will not use JLG or de-icers for de-icing or any other maintenance.

4.2.6. **KC-46.** Ensure Airplane Parking in High Winds tasks (40-60 knots) and (60-88 knots) are completed when required per -10 series technical order.

4.3. **Winds or gusts 65 knots or more (includes tornadoes):**

4.3.1. All actions for lesser winds completed.

4.3.2. Aircraft will be separated and weather-vaned (nose into the wind) and spaced, if time permits.

4.3.2.1. All outside maintenance actions not associated with aircraft separation movement will cease.

4.3.2.2. No maintenance will be conducted unless authorization is approved by the 22 MXG/CC or 931 MXG/CC.

4.3.3. **KC-46.** Ensure Airplane Parking in High winds task (88 knots or higher) is completed per -10 series technical order.

4.3.4. If directed by 22 ARW/CC, 22 OG/CC, 22 MXG CC/CD or 931 MXG CC/CD:

4.3.4.1. Initiate pyramid recall.

4.3.4.2. Prepare aircraft for weather evacuation.

4.4. **Thunderstorms:**

4.4.1. Complete actions for actual or predicted winds or gusts.

4.4.2. For hail move aircraft into hangars (if not already completed).

4.5. **Electrical Storms (Cloud to ground lightning within 10 miles):**

4.5.1. **KC-46.** Cease all fuel cell maintenance.

4.5.2. The weather flight will issue a watch with potential for thunderstorms/lightning within 10 miles, with a built in lead-time of 30 minutes.

4.5.3. The weather flight will issue a warning for observed thunderstorm/cloud to ground lightning within 10 miles.

4.5.3.1. MXS fuel shop will declare a work stoppage on KC-46 aircraft until all potentially severe weather within 10 miles has expired.

4.5.4. Non-Forecasted Weather: On-duty Production Superintendents may initiate actions to suspend maintenance at any time he/she detects a weather hazard prior to official notification from weather flight. Additionally, he/she will make prompt notification to appropriate agencies (MOC, Red 5, Green 1, Blue 1, Black 1, Archer, etc.)

4.6. **Electrical Storms (Cloud to ground lightning within 5 nautical miles):**

4.6.1. **KC-135.** Cease all fuel cell maintenance.

4.6.2. Cease all fuel servicing maintenance.

4.6.3. Enclosed hangar maintenance (other than fuel cell) may continue.

4.6.4. All personnel not directly involved with an in-flight or ground emergency will take cover inside a building or an enclosed vehicle until storm passes beyond the 5-mile limit.

4.6.5. Cease all electro explosive device maintenance within the flight line (squibs) except where minimum manning is required to meet mission or safety requirements. Squibs in work/transient must be returned to AMXS temporary storage or munitions storage area.

4.6.6. Ensure all hangar doors are closed to prevent inadvertent activation of aqueous film forming foam (AFFF) system.

4.6.7. The weather flight will issue a watch with potential for thunderstorms/lightning within 5 nautical miles, with a built in lead-time of 30 minutes.

4.6.8. The weather flight will issue a warning for observed thunderstorm/cloud to ground lightning within 5 nautical miles.

4.6.9. Non-Forecasted Weather: On-duty Production Superintendents may initiate actions to suspend maintenance at any time he/she detects a weather hazard prior to official notification from weather flight. Additionally, he/she will make prompt notification to appropriate agencies (MOC, Red 5, Green 1, Blue 1, Black1, Archer, etc.)

4.7. **De-ice Preparation:**

4.7.1. The following procedures will be used to prepare for the de-icing season, which is from 01 November to 31 March each year.

4.7.2. Secure aircraft including all doors and panels: install all protective covers IAW appropriate technical data.

4.7.3. Debrief or maintenance personnel will put the following discrepancy in all aircraft AFTO Forms 781A:

4.7.3.1. **KC-135.** "Verify flight control balance bays are free of snow, ice and slush accumulation prior to flight IAW 1C-135A-6WC-1". This entry will be on a Red X symbol.

4.7.3.2. **KC-46.** "Ice or Snow Conditional Inspection due IAW 1C-46A-05". This entry will be on a Red X symbol.

4.7.4. Prior to flight, a qualified technician will verify the completion of the inspection, necessary removal of accumulation, and sign off the 781A entry.

4.7.5. **KC-135.** When aircraft are parked on the MAPA during icing conditions, flaps will be raised to the full-up position, horizontal stabilizer positioned 2 ½ units nose down position, windows closed, window covers installed.

4.7.6. **KC-46.** When aircraft are parked on the MAPA during icing conditions or when snow falls the Wing flaps, slats, and spoilers will be fully retracted. Additionally, for the deicing procedure set the horizontal stabilizer in the full nose down position.

4.7.7. 22 LRS and 22 AMXS will check all de-icing equipment annually for serviceability to ensure readiness by 01 November.

4.7.8. 22 CES will ensure operability of de-icing pits each year by 15 October.

4.7.8.1. MXS will preposition the following equipment at the de-ice pit area: 5 light carts, 3 H-1 heaters, 3 power carts, and 2 B-5 stands (See **Attachment 2**).

4.7.8.2. AMXS will preposition the following equipment at the de-ice pit area: two fire bottles, 2 sets of aircraft chocks, Tow Bar and UKE (See **Attachment 2**).

4.7.9. Personnel preparation:

4.7.9.1. 22 OG/OGV and 22 MXG/931 MXG will coordinate an annual meeting to discuss notification procedures, aircrew alerting, and de-icing procedures prior to 01 November.

4.7.10. 22 MXG/CC or 931 MXG/CC or his/her designated representative's approval is required to tow aircraft when the runway condition reading (RCR) is less than 7.

4.8. **Extreme Heat** .

4.8.1. The Command Post notifies all base agencies of heat stress conditions via McConnell Air Force Base AtHoc Alert when the WBGT exceeds 85 degrees. The heat advisory will remain in effect until superseded by subsequent heat advisory alerts.

4.8.2. MOC will broadcast heat advisory information on all radio nets as soon as possible after notification.

4.8.3. The tables below provide workload, heat stress stages, temperature ranges, flag colors, recommended work/rest cycles and water intake for easy, moderate, and hard work IAW AFI 48-151, *Thermal Injury Prevention Program.*

Table 1. Guide to Determination of Workload.

Easy Work	Moderate Work	Hard Work
Walking on hard surface @ 2.5 mph with < 30 lb load Guard duty Drill and Ceremony	Walking on hard surface @ 3.5 mph with < 40 lb load Walking on loose sand @ 2.5 mph with no load Light maintenance work Construction equipment operation	Walking on hard surface @ 3.5 mph with > 40 lb load Walking on loose sand @ 2.5 mph with load Loading and unloading pallets Dragging hoses or lines

Table 2. Heat Guideline for Average Acclimatized Individuals.

Flag Color	WBGT (°F)	Easy Work		Moderate Work		Hard Work	
		Work / Rest Cycle	Water Intake Qt/hr	Work / Rest Cycle	Water Intake Qt/hr	Work / Rest Cycle	Water Intake Qt/hr
No Flag	78 - 81.9	No Limit	0.5	No Limit	0.75	40/20 min	0.75
Green	82 - 84.9	No Limit	0.5	50/10 min	0.75	30/30 min	1.0
Yellow	85 - 87.9	No Limit	0.75	40/20 min	0.75	30/30 min	1.0
Red	88 - 89.9	No Limit	0.75	30/30 min	0.75	20/40 min	1.0
Black	> 90	50/10 min	1.0	20/40 min	1.0	10/50 min	1.0

4.8.3.1. A very effective and simple means of deciding if a worker has reached his/her limit is through a rapid pulse rate. If a person is at risk move them to an indoor area 78 degrees (or cooler) and rest for at least 60 minutes. Consider remaining indoors for the rest of the day.

4.8.3.2. Control methods supervisors should use to prevent heat injuries include:

4.8.3.2.1. Provide cool, potable water and encourage consumption.

4.8.3.2.2. Use buddy rule and allow for frequent micro breaks so workers can set their own pace.

4.8.3.2.3. Educate workers on symptoms and controls; closely supervise to ensure understanding.

4.8.3.2.4. Work out of direct sunlight if possible (create shade if necessary).

4.8.3.2.5. Use sunscreen with SPF of 15 or higher on all exposed skin.

4.8.3.2.6. Implement work/rest cycles as per **Table 2**.

4.8.3.2.7. Workers must comply with the precautions, work/rest cycles, and water consumption directed by their supervisors.

4.9. **Extreme Cold:**

4.9.1. **During periods of cold weather, the air temperature and wind speed can play a crucial role during cold weather operations.** See below Tables **3**, **4** **5 and 6** to determine the Frostbite Risk Level (FRL), frostbite preventative measures and Equivalent Chill Temperature IAW AFI 48-151, *Thermal Injury Prevention Plan* to protect flightline personnel from injury.

Table 3. Cold Stress risk Determination (Table values indicate time in minutes to frostbite).

Wind Speed (mph/kph)	Air Temperature (°F/°C)											
	10/-12	5/-15	0/-21	-5/-21	-10/-23	-15/-26	-20/-29	-25/-32	-30/-34	-35/-37	-40/-40	-45/-43
5/8	>120	>120	>120	>120	31	22	17	14	12	11	9	8
10/16	>120	>120	>120	28	19	15	12	10	9	7	7	6
15/24	>120	>120	33	20	15	12	9	8	7	6	5	4
20/32	>120	>120	23	16	12	9	8	8	6	5	4	4
25/40	>120	42	19	13	10	8	7	6	5	4	4	3
30/48	>120	28	16	12	9	7	6	5	4	4	3	3
35/56	>120	23	14	10	8	6	5	4	4	3	3	2
40/64	>120	20	13	9	7	6	5	4	3	3	2	2
45/72	>120	18	12	8	7	5	4	4	3	3	2	2
50/81	>120	16	11	8	6	5	4	3	3	2	2	2

Note: Time in minutes until the occurrence of cheek frostbite in the most susceptible 5 percent of personnel; wet skin could significantly decrease the time for frostbite to occur

Table 4. Frostbite Risk Level (FRL) Colors.

Severity	Color	Description
Low	Green	Freezing possible but unlikely
Moderate	Yellow	Freezing could occur in 10-30 minutes
Severe	Red	Freezing could occur in 5-10 minutes
Extreme	Black	Freezing could occur in <5 minutes

Table 5. List of recommended preventative measures to decrease frostbite risk.

Frostbite Risk Level	Preventive Measures
Low	• Recommended work/rest (W/R) cycle: 50 minutes work/10 minutes warming• Increase surveillance with self and buddy checks.• Wear appropriate layers and wind protection for the work intensity.• Cover exposed flesh if possible.• Wear Vapor Barrier (VB) boots below 0 °F.• Provide warming facilities below 20 °F.• Avoid sweating.
High	• Recommended W/R cycle: 40 minutes work/20 minutes warming• Mandatory buddy checks every 20–30 minutes.• Wear appropriate layers and All Purpose Environmental Clothing System (APECS). Protect head, face and hands.• Cover exposed flesh.• Wear VB boots below 0 °F.• Provide warming facilities.• Avoid sweating.
Severe	• Recommended W/R cycle: 30 minutes work/30 minutes warming• Mandatory buddy checks every 10 minutes.• Wear appropriate layers and APECS or cold weather parka. Protect head, face and hands.• Wear VB boots.• Provide warming facilities.• Work groups of no less than two personnel.• No exposed skin.• Stay active.• Avoid sweating.
Extreme	• Mission critical work only due to extreme risk.• Keep task duration as short as possible.• Wear appropriate layers, cold weather parka, wind protection. Protect head, face and hands.• Wear VB boots.• Provide warming facilities.• Work groups of no less than two personnel.• No exposed skin.• Stay active.• Avoid sweating.

Table 6. Equivalent Chill Temperature.

WIND SPEED (mph)	TEMPERATURE (°F)											
	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
	EQUIVALENT CHILL TEMPERATURE											
5	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95

Note: Wind Chill (°F) = $35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$; T = Air Temperature (°F) and V = Wind Speed (mph)

4.9.2. Wind chill above +40F: Little danger.

4.9.2.1. Wear warm clothing in layers as necessary to avoid both chills and sweating.

4.9.3. Wind chill from +40 to –24F: Increasing danger.

4.9.3.1. Wear warm layers of insulating, dry clothing on all major areas of body (head, chest, arms, and legs).

4.9.3.2. As much as possible within mission constraints, cover the face and wear insulating gloves or mittens.

4.9.3.3. Work/rest cycle: Maximum one hour work/minimum 15 minutes rest in warm area.

4.9.3.4. All flight-line Mx work will be supervised by Pro-Super/Expediter continually.

4.9.4. Wind chill from –25 to –49F: Moderate to high danger.

4.9.4.1. Limit outdoor work to the minimum possible within mission constraints.

4.9.4.2. Wear warm layers of insulating dry clothing on the entire body.

4.9.4.3. Do not expose flesh, cover face and wear insulating gloves or mittens.

4.9.4.4. Work/rest cycle: Maximum 30 minutes work/minimum 15 minutes rest in warm area.

4.9.4.5. Use buddy rule, and check for signs of hypothermia and frostbite.

4.9.5. Wind chill below –50F: Great danger.

4.9.5.1. Non-emergency maintenance will not be conducted unless authorization is approved by the MXG/CC.

4.9.6. Emergency maintenance will follow guidelines for –25 to –49F cold weather conditions.

GEORGE N. VOGEL, Colonel, USAF
Commander, 22d Air Refueling Wing

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

AFI 48-151, *Thermal Injury Prevention Program,* 21 April 2020

AFMAN 33-363, *Management of Records,* 09 May 2018

AFPD 21-1, Maintenance of Military Materiel, 1 August 2018

T.O. 1C-46(K)A-2-WA-2 *Interactive Electronic Technical Manual (IETM)*

DAFMAN 91-203 *Air Force Occupational Safety, Fire, and Health Standards,* 04 October 2021

Prescribed Forms

None

Adopted Forms

AF Form 847, Recommendation for Change of Publication

Abbreviations and Acronyms

22 AMXS—22d Aircraft Maintenance Squadron

22 CES—22d Civil Engineer Squadron

22 LRS—22d Logistics Readiness Squadron

22 MXO—22d Maintenance Operations

22 MXG—22d Maintenance Group

22 MXS—22d Maintenance Squadron

AFFF—Aqueous Film Forming Foam

AFMAN—Air Force Manual

AFPD—Air Force Policy Directive

AFRIMS—Air Force Records Information Management System

MDS—Model Design Series

MOC—Maintenance Operations Center

MSA—Munitions Storage Area

OPR—Office of Primary Responsibility

POL—Petroleum Oil Lubrication

QA—Quality Assurance

RCR—Runway Condition Reading

SPF—Sun Protection Factor

WBGT—Wet Bulb Globe Temperature

Attachment 2

DE-ICING PIT CONFIGURATION

Figure A2.1. De-Icing Pit Configuration Illustration.