

**BY ORDER OF THE COMMANDER
51ST FIGHTER WING**

**51ST FIGHTER WING INSTRUCTION
21-113**



**17 JANUARY 2023
Certified Current, 12 March 2024
Maintenance**

**HYDRAZINE (H-70)
FAMILIARIZATION TRAINING, LEAK
DETECTION, SPILLS, AND RECOVERY
OF AIRCRAFT WITH FIRED
ACTIVATED EMERGENCY POWER
UNITS**

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This instruction implements AFPD 21-1, *Maintenance of Military Materiel*. It establishes policy and procedures to support hydrazine (H-70) familiarization training, leak detection, spills, and recovery of F-16 aircraft after operation of the Emergency Power Unit (EPU). It applies to all personnel and units assigned, attached, or tenant to the 51st Fighter Wing (51 FW). Ensure all records generated as a result of processes prescribed in this publication adhere to Air Force Instruction (AFI) 33-322, *Records Management and Information Governance Program*, and are disposed in accordance with the Air Force Records Disposition Schedule, which is located in the Air Force Records Information Management System. Refer recommended changes and questions about this publication to the OPR using the DAF Form 847, *Recommendation for Change of Publication*; route DAF Forms 847 from the field through the appropriate functional chain of command. The use of the name or mark of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the Department of the Air Force.

SUMMARY OF CHANGES

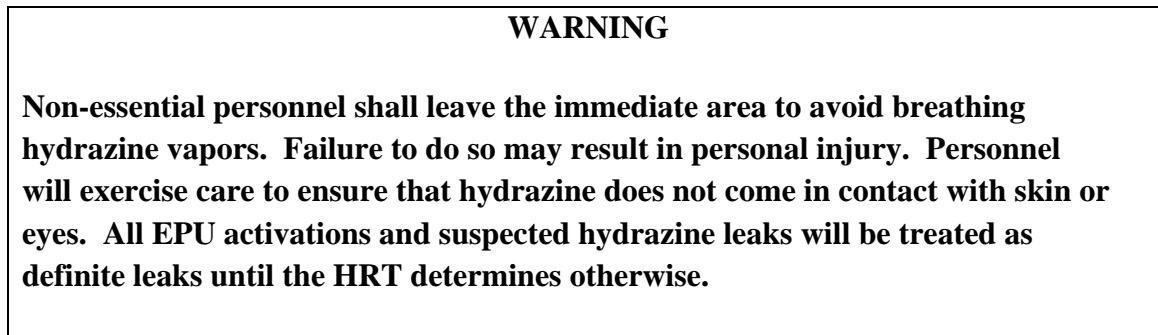
This publication has been substantially revised and needs to be completely reviewed. Major changes include: Updated building #, amount of Hydrazine stored, size of cordons, crash jet

responsibilities, authorization to destroy access panel if required, and requirements for deployed Hydrazine response.

1. Introduction. In situations where the Hydrazine Response Team (HRT) leader determines this instruction does not adequately cover procedures for the particular situation, authority is granted to add to or deviate from the procedures when safety of personnel or damage to equipment is involved.

2. Definition of Hydrazine. Hydrazine is a clear, oily liquid having an ammonia-like odor that is corrosive and highly toxic.

Figure 1. Warning Notice - Hydrazine.



3. Hydrazine Training. All aircraft maintenance and aircraft fuel systems personnel will receive familiarization training in hydrazine hazards. All unit commanders will ensure that personnel with duties in the proximity of F-16 aircraft or hydrazine also receive training.

3.1. The 51 MOS/MXOT will provide initial hydrazine familiarization training for all personnel.

3.2. The 51 MXS/MXMCF, 51 CES/CED (EOD), 51 FW/SEG, 51 AMDS/SGPB, and 51 CES/CEF will provide in-shop specialized training as required.

4. Designated Areas.

4.1. Recovering Aircraft with a Fired EPU. If the aircraft is landing on runway 27, it will be parked in the "Hot Cargo Pad" or its alternate, Taxiway "A". If the aircraft is landing on runway 09, it will be parked on taxiway "E" or its alternate, the hot brake/arming area.

4.2. Routine EPU Maintenance: The primary hydrazine maintenance area is located in the dispersal area "A", (hard stand A-10 and A-11), and flow through 15 thru 24. This area will be utilized to perform maintenance of the F-16 EPU to include: H-70 tank replacements, purge and hook-up procedures, and mono-propellant checks.

4.3. Authorized Storage Area. Building 1799 is the only facility on Osan AB authorized for the storage of hydrazine. This facility is only authorized to store hydrazine Cylinders in Caskets and 55G drums.

5. Responsibilities. Any individual who discovers leakage of a clear liquid coming from the aircraft or detects the presence of an ammonia odor will immediately evacuate the area, dial 911, notify Maintenance Operations Control Center (MOCC) through the most expeditious means possible, and seek immediate medical attention. Any other personnel not exposed, will remain a minimum of 300 feet in all directions from the suspected leak and direct response personnel upon their arrival. The following actions will be taken upon notification of a suspected hydrazine leak or spill.

5.1. The 51 MOS/MXOOM (Maintenance Operations Control Center) will:

5.1.1. Declare ground emergency and notify the Fire Department and HRT/ of a suspected hydrazine leak/spill.

5.1.2. Notify all maintenance vehicles of the suspected leak/spill location and clear radio net except for essential personnel.

5.1.3. For Major Spills (1 liter or more, typically about 4 ft in diameter when seen on the ground). Maintenance Operations Control Center will interface with all agencies responsible for disaster preparedness, fire protection, security and medical support.

5.2. The 51 CES/CEF (fire department) will:

5.2.1. Notify 51 OSS/OSAM (airfield management) to activate the secondary crash net.

5.2.2. The senior ranking fire department personnel on scene will perform all duties of the Incident Commander and is responsible for the establishment of a 300 foot initial cordon, 600 foot if winds are above 20 knots until the aircraft is ruled fire-safe. After the aircraft is deemed fire-safe, the cordon may be shrunk to no less than 150 ft. The Incident Commander will also establish the cordon entry control point upwind of the aircraft and ensure all personnel working the scene check-in with the Incident Commander prior to crossing cordon lines.

5.2.3. The Incident Commander will determine wind direction, coordinate with HRT and security police to establish position of entry, control point and appoint an entry control point guard.

5.2.4. If the spill is inside a hangar, evacuate the hangar and surrounding buildings as determined by the Incident Commander, open hangar doors as required and establish a cordon with entry control point no closer than 150 feet from entrance. The Incident Commander may adjust the cordon based on conditions and hazards present.

5.2.5. Provide a water source for dilution/neutralization of hydrazine for personnel decontamination of HRT members.

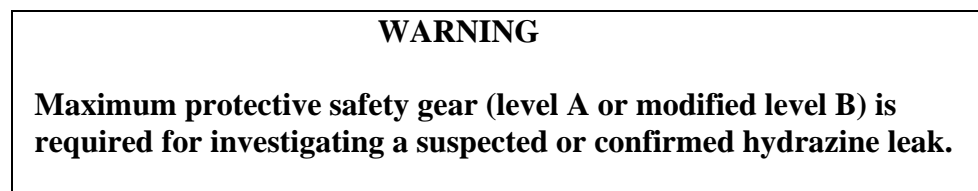
5.2.6. Maintain radio contact via Fire/Crash net with the HRT and provide condition updates to the command post as required.

5.2.7. The fire department will egress pilot from cockpit using portable oxygen bottle when hydrazine is suspected of being present.

5.3. The 51 MXS/MXMCF (Hydrazine Response Team) will:

5.3.1. Dispatch the HRT to the site of the suspected leak.

Figure 2. Warning- Safety Gear.



5.3.2. After the Incident Commander has ensured aircraft is fire safe and the cordon has been shrunk to 150 feet with controlled unfettered access to aircraft, the HRT will investigate suspected leak by the most appropriate means (visual, litmus paper, Drager multi-gas detector).

5.3.3. If a hydrazine leak is confirmed, notify Maintenance Operations Control Center and the Incident Commander that a confirmed leak/spill exists and if it is a minor (less than one liter) or major (more than one liter) leak/spill.

5.3.4. Provide situation updates to the Incident Commander.

5.4. The 51 MXS/CC or designated representative will:

5.4.1. Ensure the HRT performs inspections and conducts containment, dilution, and neutralization actions as required per applicable directives.

5.4.2. Ensure the HRT members are provided with the proper personal protective equipment, chemicals and materials for inspection, identification, and neutralization of hydrazine.

5.5. The 51 MSG/CC or designated representative will:

5.5.1. Ensure area security and cordon measures are carried out through the security forces.

5.5.2. Ensure area Emergency Operation Center (EOC) is available for activation. Activation will be directed by the wing commander as required.

5.6. The 51 CES/CED (Explosive Ordnance Disposal) will:

5.6.1. If ordinance are on board the aircraft and a leak is detected, provide a Weapons team to render safe any munitions at the direction of the Incident Commander.

5.6.2. In the event of a crashed aircraft all MUNS will be rendered SAFE prior to H-70 Bottle extraction.

5.7. The 51 CES/CEAN (Environmental Element) will:

5.7.1. Provide technical guidance and advise to the Incident Commander on issues related to implementing the Osan AB Spill Response Plan, including the location and quantities of reserve spill response supplies/materials.

5.7.2. Provide technical guidance and advice to the Incident Commander on issues related disposal of wastes.

5.8. The 51 AMDS/SGPB (Bioenvironmental Engineering) will:

5.8.1. Provide technical guidance and advice to the Incident Commander on issues related to health consequences from exposure.

5.8.2. Provide assistance in the selection of appropriate personal protective equipment.

5.8.3. Provide technical assistance in the neutralization of hydrazine.

5.8.4. Upon completion of containment and neutralization, test the aircraft or spill areas to detect any residual presence of hydrazine vapors and liquids.

5.8.5. Assist in investigations of personnel exposures to hydrazine resulting from spill or EPU activations.

5.9. The 51 SFS/S30 (Security Forces) will:

5.9.1. Establish cordon as directed by the Incident Commander.

5.9.2. Allow only those personnel into the area that are approved by the Incident Commander.

5.9.3. Evacuate the area to a distance of at least a 300 foot radius. If spills are inside a hangar, evacuate the hangar and any adjoining offices.

5.10. The 51 FW/SE (Wing Safety) will:

5.10.1. Monitor operations from outside designated perimeter until scene is mitigated for investigation.

5.10.2. Assist commanders in investigating and reporting all incidents or mishaps involving hydrazine IAW DAFI 91-204, *Safety Investigations and Reports*.

6. Procedures for EPU activation with No Visual hydrazine Leak Detected.

6.1. Once an EPU activation has been confirmed by the fire department, the Incident Commander will inform the control tower. The fire department will chock the aircraft, have the pilot ensure the EPU is placed in the “off” position, and pin the EPU. The Incident Commander will coordinate engine shutdown with the pilot before egressing pilot from cockpit using a portable oxygen bottle. If weapons are on board, the Incident Commander will ensure the weapons are safe as required.

6.2. After the Incident Commander determines the aircraft has been made fire safe and the cordon has been shrunk to 150 feet with controlled unfettered access to aircraft, he will direct the HRT to investigate aircraft for possible hydrazine leak.

6.3. If hydrazine is detected, follow procedures for fired EPU with hydrazine leak.

6.4. If it has been confirmed that no hydrazine leaks are present, the Incident Commander will inform the control tower.

6.5. The HRT will emergency depressurize the hydrazine tank.

6.6. If hydrazine is detected during the depressurization the HRT will post four hydrazine caution signs at a 150-foot radius and use the entry control point established by Incident Commander. The Incident Commander will appoint an Entry Control Point (ECP) monitor.

6.7. The HRT will, contain the leak, and perform clean-up/neutralization procedures.

6.8. Once spill has been contained and neutralized, HRT will test aircraft and surrounding area for residual presence for hydrazine. If area is determined to be safe, the aircraft will be towed to the EPU maintenance/servicing area and EPU system returned to operational ready status.

6.9. If hydrazine is not detected during the depressurization, the aircraft will be towed to EPU maintenance and servicing area and the EPU system returned to operationally ready status in accordance with T.O. 1F-16CG-2-49GS-00-1, *Emergency Power System*.

7. Procedures for EPU activation with hydrazine Leak Visually Detected.

7.1. Once a hydrazine leak has been confirmed, the Incident Commander will inform the control tower. The fire department will chock the aircraft, have the pilot ensure the EPU is placed in the “off” position, and pin the EPU. The Incident Commander will coordinate engine shutdown with the pilot before egressing pilot from cockpit using a portable oxygen bottle. If weapons are on board, the Incident Commander will ensure the weapons are safe as required.

7.2. After the Incident Commander has determined the aircraft to be fire safe and the cordon has been shrunk to a 150-foot radius ensuring controlled unfettered access to the aircraft, the HRT will post four hydrazine caution signs at the 150-foot radius and use the entry control point established by the Incident Commander. The Incident Commander will appoint an ECP monitor.

7.3. The HRT will don personal protective equipment and two members will open access panels to locate the source of the leak, while the team leader acts as a safety observer and back-up for the other two members. In the event of stuck fasteners, access panels may be destroyed if necessary to access and safe the H-70 bottle.

7.4. The HRT will emergency depressurize the hydrazine tank, contain leak, and perform cleanup/neutralization procedures.

7.5. Once the spill has been contained and neutralized, bioenvironmental will test aircraft and the surrounding area for residual presence of hydrazine. If area is determined to be safe, the aircraft will be towed to the EPU maintenance/service area and the EPU system returned to operationally ready status.

8. Deployment Requirements.

8.1. A three member team with an approved hydrazine detection unit, spill kit and personnel protective equipment will accompany all F-16 deployments consisting of four or more aircraft, lasting more than a week if the deployed location has no hydrazine support capability.

8.2. Immediately upon arrival at a non F-16 base, the Senior HRT member will coordinate with the host base representative for a briefing on the dangers of hydrazine and procedures for spills and leak responses.

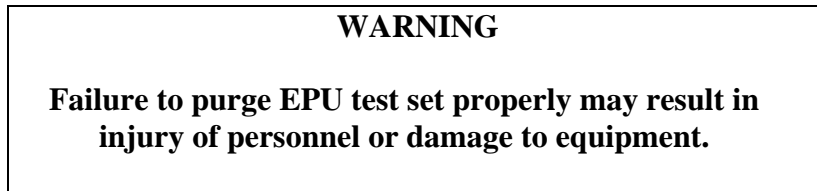
8.3. The Fuel Section Chief or designated representative will develop and maintain at least one hydrazine kit for hydrazine leaks in coordination with Bioenvironmental Engineering. The hydrazine kit will be mobile in a vehicle that is capable of holding H-70 response equipment and three each personnel and readily available for dispatch.

9. Equipment Maintenance.

9.1. To reduce the possibility of personnel becoming exposed to hydrazine vapors, the following precautions must be adhered to:

9.1.1. The EPU test set must be tested for hydrazine vapors after every use. If hydrazine is present, the equipment must be purged by qualified 2A6X4 personnel.

9.1.2. Calibration of the EPU test set will not be accomplished until the tester has been purged by qualified personnel.

Figure 3. Warning -EPU Test Set Purge.

9.1.3. Purged testers will have an AFTO Form 244, *Industrial/Support Equipment Record*, and AFTO Form 350, *Repairable Item Processing Tag*, that will be annotated to reflect the date used and date purged, and AFTO Form 20, *Caution and Inspection Record*.

9.2. Procedures in the event of personnel being exposure to H-70.

9.2.1. Exposed personnel will be isolated in an area upwind and away from the contaminated area and will need to undergo medical evaluation.

9.2.2. Personnel who are exposed to H-70 on their skin or clothing will proceed to the nearest source of water.

9.2.2.1. Clothing: Immediately remove all clothing and flush affected skin area with water for a minimum of 15 minutes. Contaminated clothing will be neutralized and disposal will be coordinated with Bioenvironmental Engineering and the Civil Engineering Environmental Element.

9.2.2.2. Eyes: Immediately flush with large amounts of water for a minimum of 15 minutes. Transport to hospital emergency room.

9.2.2.3. Inhalation: Seek medical evaluation from the medical response team and transport to hospital emergency room.

9.3. The HRT will properly neutralize and turn in all contaminated clothing and unserviceable equipment to 51 CES/CEAN for proper disposal.

10. Hydrazine Storage Facility.

10.1. Location of operation: Bldg 1799.

10.2. Safety precautions:

10.2.1. The storage facility will be identified by the appropriate chemical agents, signs, and placards mounted to all four sides of the building (fence, if installed) and easily visible from all directions.

10.2.2. Any time the facility is open, the two person concept will be used.

10.2.3. Full protective clothing and respiratory protection (level A or modified level B) for each person present will be readily available any time the building is open.

10.3. Emergency procedures:

10.3.1. Hydrazine spill: In the event of a hydrazine spill at bldg 1799, Maintenance Operations Control Center will be notified and the area evacuated to a minimum distance of 300 feet upwind.

10.3.2. Fire: In the event of a fire at bldg 1799, dial 911 and notify Maintenance Operations Control Center and evacuate personnel upwind. The area will be cordoned off a minimum of 600 ft.

10.4. Hydrazine storage limits:

10.4.1. Five full replacement hydrazine tanks for Osan AB.

10.4.2. Up to 10 Full supply point hydrazine tanks for PACAF support.

10.4.3. One U-2 replacement hydrazine tank for Osan AB.

10.4.4. Two 55G drums of hydrazine used for servicing empty Hydrazine tanks.

11. Transportation of hydrazine Fuel Tanks on Base.

11.1. Safety Procedures:

11.1.1. Transportation of hydrazine tanks will be held to a minimum.

11.1.2. All tanks, either empty or containing any amount of Hydrazine, will be transported in a Department of Transportation (DOT) approved shipping container only.

11.1.3. The two person concept will be used during all phases of transport.

11.2. The fuel shop supervisor will inform Maintenance Operations Control Center prior to and upon completion of transport of Hydrazine tanks to and from the storage facility.

11.3. Emergency procedures: In the event a shipping container develops a leak in transit, the Maintenance Operations Control Center will be immediately notified and personnel will evacuate to a minimum distance of 300 feet upwind of the site.

11.4. Maintenance Operations Control Center will:

11.4.1. Maintain status of the transport operation, including advance knowledge of route to be used.

11.4.2. Initiate emergency notification procedures if a spill or leak occurs during transportation.

11.5. Ensure each transport vehicle will carry *no more than* three full hydrazine tanks at any given time.

11.6. Personnel limits:

11.6.1. Maximum: One supervisor, four workers.

11.6.2. Minimum: One supervisor, two workers.

11.7. Equipment requirements:

11.7.1. Government vehicle (GOV).

11.7.2. Fuel tank shipping/handling/storage container DOT approved).

11.7.3. Personal protective clothing (three sets):

11.7.3.1. Boots.

11.7.3.2. Apron.

- 11.7.3.3. Gloves.
- 11.7.3.4. Face Shield.
- 11.7.3.5. Self-contained (level A or modified B) Breathing Apparatus.
- 11.7.4. Maintenance net radio.
- 11.7.5. DOT poison, corrosive material, and flammable liquid placards.

JOSHUA T. WOOD, Colonel, USAF
Commander

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

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

AFI 33-322, *Records Management and Information Governance Program*, 23 March 2020

DAFI 91-204, *Safety Investigations and Reports*, 10 March 2021

DAFI 91-204 PACAFSUP, *Safety Investigations and Reports*, 16 September 2021

DAFM91-20, *Air Force Occupational Safety, Fire and Health Standards*, 25 March 2022

T.O. 1F-16CG-2-49GS-00-1, *Emergency Power System*, 1 January 2022

T.O. 6J14-4-11-2, *Maintenance Instructions Intermediate Fuel Storage Tank*, 14 February 2020

Prescribed Forms

None

Adopted Forms

DAF Form 847, *Recommendation for Change of Publication*

AFTO Form 20, *Caution and Inspection Record*

AFTO Form 244, *Industrial/Support Equipment Record*

AFTO Form 350, *Repairable Item Processing Tag*

Abbreviations and Acronyms

51 FW—51st Fighter Wing

DOT—Department of Transportation

ECP—Entry Control Point

EOC—Emergency Operation Center

EPU—Emergency Power Unit

GOV—Government vehicle

H-70—Hydrazine

HRT—Hydrazine Response Team

MOCC—Maintenance Operations Control Center