



National Aeronautics and  
Space Administration

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**George C. Marshall Space Flight Center**  
Marshall Space Flight Center, Alabama 35812

**CONTROL OF HAZARDOUS ENERGY  
(LOCKOUT / TAGOUT) PROCEDURE  
FOR  
THE ENVIRONMENTAL TEST FACILITY**

**ENVIRONMENTAL TEST FACILITY BRANCH  
STRUCTURAL AND ENVIRONMENTAL TEST DIVISION  
TEST LABORATORY  
ENGINEERING DIRECTORATE**

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**This Procedure Describes  
Safety Critical Operations**

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**(LOCKOUT / TAGOUT) PROCEDURE  
FOR  
THE ENVIRONMENTAL TEST FACILITY**

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Control of Hazardous Energy (Lockout/Tagout) Procedure for the Environmental Test Facility	ET24-LOTO-SOP-001	Revision: Baseline
	Date: 1 August, 2005	Page iii of iv

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Marshall Space Flight Center ET24		
Control of Hazardous Energy (Lockout/Tagout) Procedure for the Environmental Test Facility	ET24-LOTO-SOP-001	Revision: Baseline
	Date: 1 August, 2005	Page iv of iv

## TABLE OF CONTENTS

SECTION		PAGE
<b>1.0</b>	<b>GENERAL INFORMATION</b>	<b>1</b>
1.1	PURPOSE	1
1.2	SCOPE	1
1.3	APPLICABLE DOCUMENTS	1
1.4	SAFETY	2
1.5	EMERGENCY TELEPHONE NUMBERS	2
1.6	DEFINITIONS	3
<b>2.0</b>	<b>REQUIREMENTS AND RESPONSIBILITIES</b>	<b>3</b>
2.1	LOCKOUT/TAGOUT OF EQUIPMENT	4
2.2	TRANSFER LOCKOUT/TAGOUT TO ANOTHER AUTHORIZED EMPLOYEE	5
2.3	RESTORE THE EQUIPMENT TO SERVICE	5
<b>3.0</b>	<b>ANNUAL INSPECTION</b>	<b>6</b>

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Marshall Space Flight Center ET24		
Control of Hazardous Energy (Lockout/Tagout) Procedure for the Environmental Test Facility	ET24-LOTO-SOP-001	Revision: Baseline
	Date: 1 August, 2005	Page 1 of 6

## 1.0 GENERAL INFORMATION

### 1.1 PURPOSE

This procedure establishes the minimum requirements for the lockout/tagout of energy-using devices whenever maintenance or servicing is done on equipment. It ensures that the equipment is stopped, isolated from all potentially hazardous energy sources, and locked out or tagged out before employees perform any servicing or maintenance where the unexpected energizing or start up of the equipment or release of stored energy could cause injury. Lockout/Tagout at ET24 shall be in accordance with the Marshall Space Flight Center (MSFC) Lockout Tagout Program.

### 1.2 SCOPE

This document applies to all ET24 civil service and contractor personnel performing work in the Environmental Test Facility (ETF) at MSFC Building 4619 and the Thermal Development Facility Building 4612. This document specifically applies to the control of energy during installation, servicing and/or maintenance of affected equipment in test operations at MSFC. The document is particularly concerned with electrical, mechanical, pneumatic (pressurized gas or air), and cryogen control.

This document does not apply to work on cord- and plug-connected electrical equipment when the plug is under the exclusive control of the employee performing the servicing and/or maintenance.

### 1.3 APPLICABLE DOCUMENTS

MPR 8715.1	Marshall Safety, Health, and Environmental (SHE) Program
MWI 8715.2	Lockout Tagout Program
ET24-ETF-OWI-001	Environmental Test Facility Test Operations
ED26 (02-01)	Memorandum for Record, Safety Assessment for the ETF (soon to issued as an ET24 memo, number unknown)

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Marshall Space Flight Center ET24		
Control of Hazardous Energy (Lockout/Tagout) Procedure for the Environmental Test Facility	ET24-LOTO-SOP-001	Revision: Baseline
	Date: 1 August, 2005	Page 2 of 6

## 1.4 SAFETY

All test personnel working in this facility shall be familiar with the safety documents listed in Section 1.3 and shall report any safety hazards, unsafe practices, safety incident or near misses to the ET24 Branch Chief or the 4619 Building Manager Assistant.

In addition to the above safety precautions, all personnel involved in facilities using cryogenics shall be aware of the possibility of burn injuries caused by contact with cold surfaces or liquids. All personnel involved in handling of cryogenics or when making repairs/modifications to cryogenic facilities shall wear protective clothing including eye protection and gloves. In the event of a cryogenics spill, line ruptures, or similar emergencies, personnel shall first be sure that there is no possibility of asphyxiation due to oxygen displacement. Use a portable oxygen monitor to verify the area is safe before entering.

The test chambers can reach extreme temperatures both hot and cold. A test chamber shall be given sufficient time to return to ambient temperature  $\pm 10$  degrees C ( $\pm 18$  degrees F) before opening a chamber door so that there is minimal risk of injury from extreme temperature.

ET24 Safety Assessment, Memorandum of Record ED26 (02-01) (soon to be issued as an ET24 memo, number unknown) lists procedures, personal protective equipment (PPE) requirements and job hazard analysis (JHAs) for hazards associated with operation at the ETF. Operators shall review the safety assessment to determine the JHAs and PPE that applies to an operation and implement the risk mitigation methods listed in the JHAs and use the required PPE to minimize risk from potential hazards during chamber operations.

## 1.5 EMERGENCY TELEPHONE NUMBERS

Dial 911 for all emergencies, including:

Medical	911
Fire	911
Ambulance	911
Security	911
Chemical Spills	911

Other numbers that can be used to obtain information about emergency, security, safety, and utilities are:

Medical Center	544-2390
Security	544-4357
Safety	544-0046

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Marshall Space Flight Center ET24		
Control of Hazardous Energy (Lockout/Tagout) Procedure for the Environmental Test Facility	ET24-LOTO-SOP-001	Revision: Baseline
	Date: 1 August, 2005	Page 3 of 6

Utilities                    544-3919  
Other Assistance 544-4357 (4-HELP)

## 1.6 DEFINITIONS

Definitions in Section 5 of MWI 8715.2 are applicable to this procedure. The uniform resource locator (URL) for master list with that procedure is:  
<https://repository.msfc.nasa.gov/directives/directives.htm>

In addition to MWI 8715.2 definitions:

List of Affected Equipment: ETF Drawings 4619-M000 Sheets 1 through 3 are used as The List of Affected Equipment. These drawings list the equipment and reference drawings on mechanical, electrical and fluid systems for the equipment. These reference drawings identify points of isolation from energy source needed to implement lockout/tagout. ETF Drawings 4619-M000 are posted on the ETF Bulletin Board near room 104 in Building 4619.

## 2.0 REQUIREMENTS AND RESPONSIBILITIES

\*\*\*\*\* **WARNING** \*\*\*\*\*

Maintenance or operating procedures, techniques, restrictions, etc., that may result in severe personnel injury, loss of life or major equipment damage if not followed exactly.

\*\*\*\*\*

Compliance with this document shall be the responsibility of each employee working within the MSFC ET24 Branch.

Only ET24 personnel that have been trained and certified to perform lockout/tagout shall be authorized to perform lockout/tagout of equipment. Personnel performing lockout/tagout shall follow and meet the requirements of this procedure. MSFC Certification Tracking (CERTRAK) database provides a record of authorized personnel.

CERTRAK URL: <https://msfcsma3.msfc.nasa.gov/dbwebs/apps/training/certs/>  
These authorized personnel shall document the lockout/tagout using MSFC Form 4287. Blank lockout/tagout forms are available on MSFC Forms at URL  
<http://starbase.msfc.nasa.gov:8000/forms/forms.taf>

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<b>Marshall Space Flight Center ET24</b>		
<b>Control of Hazardous Energy (Lockout/Tagout) Procedure for the Environmental Test Facility</b>	<b>ET24-LOTO-SOP-001</b>	<b>Revision: Baseline</b>
	<b>Date: 1 August, 2005</b>	<b>Page 4 of 6</b>

Forms 4287 shall be retained in the yellow colored Safety Lockout/tagout Center during the lockout/tagout and for one year after removal of locks and tags. Following the one-year retention period after the locks and tags are removed, Forms 4287 shall be reviewed.

Note: If the authorized person is not completely familiar with the piece of affected equipment needing lockout/tagout, they shall request assistance from personnel more familiar with the equipment. Personnel that shall be more familiar with the equipment and its energy sources include the operators of the equipment, ET24 Engineers, the ET24 Technical Lead, or the personnel that developed the drawings for that equipment.

Assistant Building Manger shall be responsible for annually reviews of ompleted Lock-out Tagout procedures.

Other task assignments and responsibilities at the ETF shall be in accordance with the organizational work instruction (OWI) ET24-OWI-ETF-002.

## **2.1 LOCKOUT/TAGOUT OF EQUIPMENT**

An authorized employee shall:

- 2.1.1 Complete the header and Step 1 of MSFC Form 4287.
- 2.1.2 Determine isolation points using equipment drawings listed in Drawing Number 4619-M000. Drawing Number 4619-M000 is posted on the ETF Bulletin Board near Room 104 in Building 4619. Equipment drawings are located in the ETF Library in the file for that equipment.
- 2.1.3 Complete Steps 2 through 7 of MSFC Form 4287. Use a calibrated instrument for measuring energy intensity.
- 2.1.4 Get another employee to verify the lockout/tagout is completed correctly. This employee shall sign off in Section 7 of Form 4287 to record the verification.
- 2.1.5 Complete Step 8 of Form MSFC 4287.

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Marshall Space Flight Center ET24		
Control of Hazardous Energy (Lockout/Tagout) Procedure for the Environmental Test Facility	ET24-LOTO-SOP-001	Revision: Baseline
	Date: 1 August, 2005	Page 5 of 6

## **2.2 TRANSFER OF LOCKOUT/TAGOUT TO ANOTHER AUTHORIZED EMPLOYEE**

An authorized employee who performed the lockout/tagout shall:

- 2.2.1 Verify the person who is assuming the work is an authorized employee.
- 2.2.2 Direct the person to start a new Form 4287 and attach it to front of the original 4287. Complete section completed on the first form. Section 1a and 1b may be omitted if there are no new persons to notify. Write "TRANSFER SEE ORIGINAL 4287" at the top of the new form.
- 2.2.3 Direct new person to hang new tagout card at the energy control device and remove the original tagout card.
- 2.2.4 Assist the new person in verifying the equipment is in a zero energy state.
- 2.2.5 Write on the last completed step of the original Form 4287 "TRANSFER to (new person's name) at the top of the original form."
- 2.2.6 Give lockout key to new person.

## **2.3 RESTORE THE EQUIPMENT TO SERVICE.**

- 2.3.1 ONLY THE PERSON WHO PLACED THE LOCK IS AUTHORIZED TO REMOVE THEIR LOCK. THE PERSON PLACING THE LOCK SHALL BE THE PERSON ACTUALLY PERFORMING THE SERVICE OR MAINTENANCE. An exception is allowed for removal of the lock if the person that placed the lock is not at the ETF and is not available to return. Deviations to this procedure shall be authorized by the ET24 Branch Chief. The procedure deviation shall demonstrate equivalent safety is maintained when the lock/tag is removed by another authorized employee. Should the person that placed the lock/tag return The ET24 Branch Chief or a designee shall inform the person immediately that the lock is removed.
- 2.3.2 Complete Steps 9 and 10 of MSFC Form 4287.
- 2.3.3 Remove tags and locks and return to ETF Safety Lockout/tagout Center. File the completed MSFC Form 4287 in the ETF Library at the Safety Lockout/tagout Center. Any Forms 4287 and tags more than one year since removal may be removed from the center and discarded.

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<b>Marshall Space Flight Center</b> <b>ET24</b>		
<b>Control of Hazardous Energy  (Lockout/Tagout) Procedure for  the Environmental Test Facility</b>	<b>ET24-LOTO-SOP-001</b>	<b>Revision: Baseline</b>
	<b>Date: 1 August, 2005</b>	<b>Page 6 of 6</b>

### **3.0 ANNUAL INSPECTIONS**

An Authorized person other than the person performing the lockout/tagout shall inspect completed Forms 4287. Record the inspection on the form 4287. This inspection shall be performed annually. Any Forms 4287 and tags for activities that occurred more than one year prior to the annual inspection may be removed from the center and discarded.

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