

# IPS ★ ITC

Industrial Performance Services

Industrial Tubular Catalyst Services

## ELECTRICAL TOOL SAFETY AND ASSURED GROUNDING PROCEDURE

V:2023.1

# Electrical Tool Safety and Assured Grounding Procedure

January 2023

## **A. GENERAL**

This procedure provides the standard method for implementing and maintaining an Assured Equipment Grounding Conductor program for all construction activity.

## **B. SCOPE**

This procedure outlines specific electrical inspection procedures and the frequency of inspection for construction electrical tools and electrical equipment.

This procedure does not supersede the requirements to visually inspect all hand tools before and after each use, nor does it supersede the requirements to test a test instrument before and after each use.

## **C. RESPONSIBILITIES**

The job superintendent or designee shall maintain a record of all construction electrical equipment on the site.

The electrical superintendent or designee shall inspect construction electrical tools and electrical equipment as outlined in this procedure and shall keep records of all inspections and repairs performed throughout duration of project (refer to Attachment 45A).

## **D. PROCEDURES**

Electrical tools or electrical equipment determined by inspection to be in need of repair are to remain tagged “defective” until repaired. Following repair, the tool or equipment must be inspected before it can be used in the field.

**Under no circumstances may tools or equipment in need of inspection or repair remain in service.**

Each craft shall ensure that electrical tools and equipment it has, or is using, bear the current inspection tape or tie raps. Before using any electrical tools and equipment, the craftsman shall visually inspect such equipment for defects. If any defect is found or the equipment does not bear a current inspection sticker, the equipment shall be delivered to the electrical superintendent or designee for inspection.

## **E. INSPECTION/MARKING SYSTEM**

The frequency for periodic inspection of construction electrical tools and electrical equipment shall be indicated by attached color-coded tape or color-coded tie raps. The craftsman using the tools and equipment shall ensure that the markings remain on between inspections. The color codes and their corresponding scheduled inspection dates are:

Color Code	Month(s)
White	January – March
Green	April – June
Red	July – September
Orange	October – December

## D. QUARTERLY INSPECTIONS

Portable electrical hand tools, all portable electrical equipment, cord sets, and adapters shall be inspected quarterly using an approved tester in conjunction with a visual inspection. For example:

- Model B-2500 tester made by Pow-R-Safe division of Multi-Amp Corporation, 4271 Bronze Way, Dallas, TX 75237
- Model 1020 ECOS electrical safety analyzer made by ECOS Electronics Corporation, 205 West Harrison Street, Oak Park, IL 60304

As a minimum, the visual inspection must include the following:

- Checking the cord for worn or cracked insulation.
- Checking the cord entry to plug and tools housing for frayed or worn insulation and strain relief.
- Checking the plug prongs for damage.
- Checking the plug for exposed connectors.
- Checking the equipment housing for damage.

Voltage testers or measurement devices shall be inspected quarterly. The electrical test for inspecting voltage testers or measurement devices should include testing live AC and DC voltage. Personal protective equipment shall be worn while testing.

As a minimum, the visual inspection shall include:

- Checking the leads for signs of wear, poor connections at probes, etc.;
- and
- Checking the housing and the readout window for cracks, loose screws, etc.

## E. DOUBLE-INSULATED TOOLS

Double-insulated, portable hand tools may be used provided they bear the Underwriters Laboratories' "double-insulated" label and are of heavy-duty construction.

Double-insulated tools shall be inspected quarterly. The inspection shall include the visual inspection as already outlined.

As use of certain test instruments can damage electronic components in computers and similar office equipment, visual inspection is all that is necessary for that type of office equipment.

Local national legislation and codes of practice may dictate a different procedure. It is the responsibility of project management to ensure that a procedure compatible with local requirements is drawn up and implemented.

- GROUND FAULT CIRCUIT INTERRUPTERS (GFCI)

This procedure also provides guidelines for using ground fault circuit interrupters (GFCI) in 15-amp and 20-amp single phase circuits of construction sites. This procedure is an alternate to the OSHA Assured Equipment Grounding Conductor (AEGC) procedure (APS 8-12).

- DEFINITIONS

- Class “A” Ground Fault Circuit Interrupter (GFCI)

A GFCI that removes voltage from a tool when the current imbalance is greater than six milliamperes. Class “A” GFCIs are used for personnel protection.

- Class “B” Ground Fault Circuit Interrupter (GFCI)

A GFCI that removes voltage when the current imbalance exceeds 30 milliamperes. This device is intended for equipment protection and must not be used for personnel protection. Class “B” GFCIs are normally used in heat-tracing circuits.

- Ground Fault Circuit Interrupter (GFCI)

An electrical device that compares the amount of current flow between the supply and return conductors. When an imbalance of current flow is measured (by comparison) greater than the design intent, the device removes voltage from the tool. GFCIs are manufactured for two purposes: personnel protection and equipment protection.

**Note!!!** *The term GFCI is a U.S. based term. Similar equipment is available in other countries. Use of the term “GFCI” is intended to mean similar equipment with other names in other countries.*

- EQUIPMENT

GFCIs function only on an AC voltage. GFCI test devices must not be used on DC circuits.

- REQUIRED USE

OSHA 1926.404 requires the use of either an assured grounding program or GFCIs for all portable tools for all construction activity. Contractors must use GFCIs for all circuits on which portable electrical hand tools are used. This must be included as a requirement in the contract documents. GFCIs must be listed by Underwriters Laboratory (UL) and bear the UL mark or the mark of another government-approved agency. GFCIs should be inserted in the circuit as close to the electrical source as practical.

GFCI protection is required for all 120-volt portable hand tools used inside a vessel or in wet areas. Some portable GFCIs are not waterproof, which may allow nuisance tripping of the circuit.

- TYPES OF GFCIs

Receptacle	Receptacle-type GFCIs protect only the receptacle and equipment plugged directly into the receptacle.
Feed-Through	Feed-through type GFCIs protect equipment plugged into the receptacle and all other receptacles connected electrically downstream. Downstream receptacles should be identified as protected by a GFCI.
Panel Circuit	Panel circuit-breaker type GFCIs protect an entire circuit. They are Breaker installed in the circuit-breaker panel. Protected receptacles should be identified as protected be a GFCI.
Cord-Connected	Cord-connected type GFCIs contain several receptacles, each protected by a GFCI. An example is the Hubbel Spider.
In-Line	In-line GFCIs are molded into extension cords.
Plug-In	Plug-in model GFCIs can be inserted into normal receptacles, and they protect all equipment plugged into the devices.

- PERSONAL PROTECTION

Use only “Class A” GFCIs for personnel protection.

Note: A GFCI will not protect persons in contact with either two circuits at once or a circuit other than the one being used. A GFCI will only protect downstream on one circuit.

- LIGHTING

Lighting for vessel entry shall be provided by low voltage explosion-proof systems where there is explosibility potential is not prevalent, lighting electrical sources shall be equipped with GFCIs.

- TESTING

All GFCIs have a test button. Each GFCI should be tested using the test button every time the GFCI is used.

Inspect and test GFCIs quarterly. A valid test can be performed by inserting a Hubbel GFT-2G testing device and rotating the knob clockwise until the GFCI trips. The device must trip at or before six milliamperes. An alternate testing device is Sotcher Measurement G.F.I. tester, model 440 or equivalent.



# Competency Assessment

No.	Questionnaire	C/NYC
Q1		
A1		
Q2		
A2		
Q3		
A3		
Q4		
A4		
Q5		
A5		

Enclosed Attachments	
Risk Assessment	<input checked="" type="checkbox"/>
Environmental Aspect and Impact	<input checked="" type="checkbox"/>
Training and Competency	<input checked="" type="checkbox"/>
Measure and Evaluation Tools	<input checked="" type="checkbox"/>



# Competency Checklist

To be filled out by Trainer and signed by Employee, Assessor and Supervisor before being returned to the HSEQT Manager for recording purposes.

Procedure	Competency	Date	Competent YES / NO	Employee Signature

(Please tick appropriate box)

This employee is competent in performing the job.


This employee has not attained the competency level.

\*

\* *If the employee has not attained all competency levels, the General Manager must assess the action to be taken, provide an extension of training or alternative action as listed below.*

Alternate action to be taken: \_\_\_\_\_

Signed By	Employee:	_____	Date:	_____
	Trainer:	_____	Date:	_____
	Assessor:	_____	Date:	_____
	Regional Manager:	_____	Date:	_____

# Environmental Aspects and Impacts

## Identified Environmental Aspects and Impacts

The following table is a summary of the likely environmental aspects and impacts that may be identified during site inspections. The significance of each impact needs to be assessed using the Risk Assessment Model.

Activity	Aspect	Impact
<b>Purchasing &amp; Administrative Work</b>	Consumption of goods	Conservation of natural resources
	Consumption of energy (eg. Electrical equipment and facilities)	Release of greenhouse gases and atmospheric pollution; Consumption of natural resources; Habitat loss
	Generation of waste (eg. Paper)	Consumption of space for waste disposal; Habitat loss
<b>Climate Control</b>	Consumption of energy	Release of greenhouse gases and atmospheric pollution; Consumption of natural resources; Habitat loss
	Generation of noise	Disturbance to community; Habitat loss
<b>Cleaning of – offices / vehicles</b>	Storage, use and release of chemicals	Contamination of air, water or soil; Risk to human health
<b>Transport (Fleet vehicles / staff travel)</b>	Consumption of energy	Release of greenhouse gases and atmospheric pollution; Consumption of natural resources; Loss of habitat at all stages of generation; Light pollution
	Consumption of goods (eg. Oil)	Consumption of natural resources; Generation of waste; Habitat loss; Biodiversity impacts
	Generation of waste (eg. Oil)	Consumption of space for waste disposal; Potential contamination of water or soil; Habitat loss
	Exhaust emission	Release of greenhouse gases and atmospheric pollution
	Use of dangerous goods (eg. Batteries)	Potential contamination of air, water or soil; Risk to human health
	Generation of noise	Disturbance to community; Habitat degradation
<b>Operations</b>		

Sample only.  
To be filled in

# Risk Assessment

Risk Assessment // insert name here					
Step No: Logical sequence	Sequence of Basic Job Steps documented in the Procedure, Work Instruction and project plans. Break down Job into steps.  Each step should be logical and accomplish a major task.	Potential Safety & Environmental Hazards/Impacts at the site of the Job  Identify the actual and potential health and safety hazards and the environmental impacts associated with each step of the job.	Risk Rating  Refer to the risk matrix or HSEQT.PRO. Risk Mgt	Recommended Corrective Action or Procedure  <i>Determine the corrective actions necessary to reduce the risk to as low as reasonably practical (ALARP) refer to HSEQ.PRO.Risk Mgt. The risk must be reduced or controlled to ALARP before work commences.</i>  Document who is responsible for implementing the controls to manage each hazard identified.	Risk Rating refer to the risk matrix or HSEQT.PRO.Risk Mgt
1.					
2.					
3.					
4.					
5.					

# Audit



<b>Process:</b> insert// <b>Procedure:</b> Insert //		Date:	Audited by:	
		Location of Audit:	Area Mgr/Supervisor:	
Item	Question	Evidence Sited	Comments	Conformance Score 0,3,5
1.				
2.				
3.				
4.				
5.				
6.				
7.				
AUDITOR'S SIGNATURE:		CONFORMANCE SCORE:     / 25		0 – Non-Conformance 3 – Continuous Improvement Opportunity 5 – Total Conformance
SAFETY REP'S SIGNATURE:		CONFORMANCE %:		