

<b>EVERSOURCE</b>		<b>TD858</b>		<b>Revision 1</b>	
<b>TD PROCEDURE</b>		<b>Testing of Temporary Protective Grounds</b>			
<b>Issue Date:</b> 02/29/2012	<b>Effective Date:</b> 02/29/2012	<b>Owner Department:</b> Transmission Maintenance & Work Management		<b>Applicability:</b> CT, Western MA, NH Trans Only	
		<b>Subject Matter Expert:</b> Jorin Grori			

**All changes to TD procedures are controlled by TD 001**

**“Writing, Revising, and Publishing Transmission and Distribution Procedures.”**

This procedure replaces and supersedes the following procedures (in whole or in part), as described in Section 3 “Summary of Changes”:

- TD 858, “Testing of Temporary Protective Grounds”, Rev 0 dated 12/17/2010

**Roll Out Instructions:**

Prior to initial use of this procedure, each individual using this procedure is required to attend training on this procedure delivered during Bi-Monthly Safety Meeting or similar.

**Approvals:**

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Director-Transmission Maintenance & Work Mgmt

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**Procedure applicable only to states for which an approval signature appears above.**

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## 1. INTRODUCTION

### 1.1 Objective

This procedure provides instructions for in-service maintenance, inspection and testing of Temporary Protective Ground assemblies used for personnel protection on de-energized lines or equipment.

### 1.2 Applicability

This guideline pertains to CT, Western MA, and NH Transmission only.

1.2.1 This procedure applies to all personnel who apply, use, or test temporary protective grounds.

1.2.2 All Temporary Protective Grounds shall be tested prior to initial use.

1.2.3 All Temporary Protective Grounds shall be tested every two years or when any major component (e.g., clamp, ferrule, or cable) of the assembly is repaired, replaced, or suspect.

#### **NOTE**

Any Temporary Protective Ground subjected to a fault shall be discarded.

### 1.3 References

Unless otherwise specified:

- Forms are available through Lotus Notes NU Forms Catalog or NU Forms Catalog on the NUNet.

Procedures are available in the:

- Lotus Notes Field Documentation Database
- Lotus Notes Regulated Businesses Policies & Procedures database
- Distribution Engineering Standards Bookshelf

#### **Development References**

Documents used to develop this procedure and the process it controls:

- TD 001 “Writing, Revising, and Publishing Transmission & Distribution Procedures”
- Code of Federal Regulations Title 29 CFR 1910 - Occupational Safety and Health Standards, Subpart R, Paragraph 1910.269(n), “Grounding For the Protection of Employees”
- ASTM F 855 –14, “Standard Specifications for Temporary Protective Grounds to Be Used on De-energized Electric Power Lines and Equipment”
- ASTM F 2249 – 03 (2009), “Standard Specification for In-Service Test Methods for Temporary Grounding Jumper Assemblies Used on De-Energized Electric Power Lines and Equipment”

- A.B. Chance I.B. C403-3222, “Instructions for the Preparation and Use of New and Improved Protective Grounding-Set Tester Catalog No. C403-3220”
- Hastings I.B. P15094R8, “Ground / Jumper Assembly Tester Catalog No. 6714”

### **Supporting References**

Documents that support performance of activities directed by this procedure:

- Code of Federal Regulations Title 29 CFR 1910 - Occupational Safety and Health Standards, Subpart R, Paragraph 1910.269(n), “Grounding For the Protection of Employees”
- TD 703, “Temporary Protective Grounds for Personnel Protection in Substations”
- TD 855, “Grounding for Personal Protection on Overhead Distribution Lines”
- M8-MT-3003, “Temporary Protective Grounding for Personal Protection on Overhead Lines, 69kV and Above”
- PSNH SH-6051, “Test Method for Temporary Protective Grounding (TPG) Assemblies”
- M4-WP-3102, “Chance Temporary Protective Grounds (TPGs) Testing”
- M4-WP-3104, “Hastings Temporary Protective Grounds (TPGs) Testing”
- SBST-07-07, “Testing of Temporary Protective Grounds”

### **Supporting Programs and Databases**

Programs and databases that support performance of activities directed by this procedure:

- None

## **1.4 Discussion**

1.4.1 Temporary Protective Grounds (TPGs) are an essential piece of protection against electrical hazards. Temporary Protective Grounds limit the voltage rise at the work site to a safe value in those cases where the equipment or line being worked upon is accidentally energized. They also provide a means for fault current to flow, allowing upstream protective devices to trip. A secondary function of protective grounds is to protect against inductively coupled voltage from adjacent parallel energized lines or capacitively coupled voltage from adjacent equipment.

Damage, wear, and weathering of Temporary Protective Grounds components, which may not be immediately evident, may prevent the assembly from performing as intended. To ensure the TPGs are in good condition, they must be inspected, maintained, and tested. This procedure contains guidelines to ensure these goals are accomplished.

1.4.2 It is recognized that Temporary Protective Grounds may be installed for extended periods of time, especially in Construction situations. It is not the intent of this procedure to require that TPGs that have already been applied be removed for testing solely due to test date considerations; however, it is recommended that such Portable Grounds be rotated through a test protocol as availability allows.

1.4.3 In acknowledgement of the above, it is expected that the personnel applying Temporary Protective Grounds in support of Maintenance or Construction activities utilize equipment that will remain within the recommended biennial test envelope to the greatest extent possible based on the expected duration of the job.

## 2. INSTRUCTIONS

### 2.1 Pre-Test Cleaning and Inspection of In-Service Temporary Protective Grounds

*Assigned Employee (AE)*

- 2.1.1 Disassemble each clamp (including removable jaws, where equipped) and clean all contact and mating surfaces (including any set-screws) and the ferrule-clamp connection point, using a stiff wire brush or Scotch-Brite<sup>®</sup> pad as necessary.

#### **NOTE**

Apply a thin film of conductive grease or joint compound to the mating surfaces and set screws of clamps equipped with removable jaws prior to re-assembly.

- 2.1.2 Re-assemble clamp parts, inspecting for:

- Sharp edges, cracks, splits, or defects
- “Loose” operation or binding

- 2.1.3 Inspect cable for:

- Broken strands or black deposits/discoloration at the cable termination
- Extensively damaged or burned jacket material
- Swollen jacket or soft spots
- “Mashed” or flattened cable
- Damaged cable terminations

- 2.1.4 Repair or replace any TPG assembly components exhibiting defects as described in 2.1.2 or 2.1.3

- 2.1.5 Re-attach clamps:

- a. Securely attach each clamp to cable ferrule and tighten lock nut to manufacturer’s recommended value (typically 25 ft.-lb.).
- b. Attach cable to clamp using stress relief device (cable support or tie-wrap) as equipped.

### 2.2 Testing Temporary Protective Ground (TPG) Assemblies

*AE*

- 2.2.1 A.B. Chance Test Set

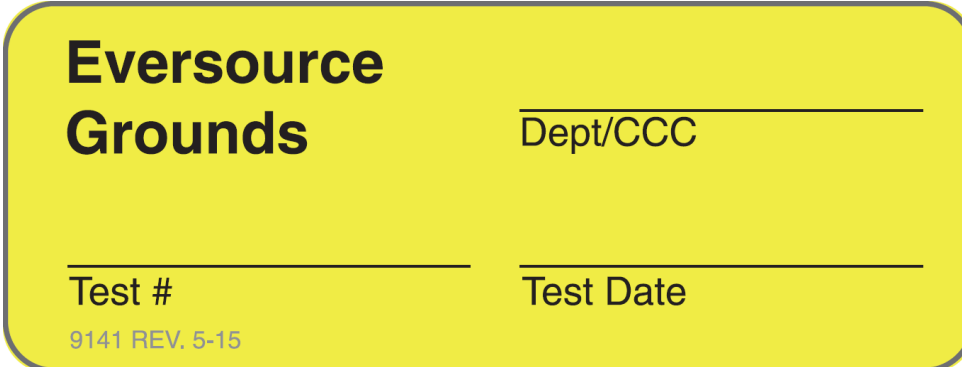
- a. Refer to Attachment 2 for model and accessory information.
- b. Refer to M4-WP-3102 for A.B. Chance Test Set operational setup and testing.

- 2.2.2 Hastings Test Set 6714 (S/C # 0443177)

- a. Refer to Attachment 2 for model and accessory information.
- b. Refer to M4-WP-3104 for Hastings Test Set operational setup and testing.

## 2.3 Test Completion and Record-Keeping

- 2.3.1 Each department that performs tests on temporary protective grounds shall maintain a log (refer to Attachment 3) or database documenting the tests. The log shall include, as a minimum:
- The department name (or CCC number) and initials of the person performing the test.
  - The date of the test.
  - A unique “test number” for the test (a suggested format is “yy ####”, where “yy” is the last two digits of the current year and “####” is a sequential number – e.g., 001, 002, etc.).
  - A description of the TPG assembly being tested, including cable size, length (tip-tip of ferrules), and type of clamp(s).
  - The type of test set used, (e.g., “Hastings”, “Chance”, “Ductor”).
  - The test values/acceptance criteria.
  - The test results/readings obtained.
- 2.3.2 For TPG assemblies that pass the test, affix a label documenting the test to one end of the assembly. Two types of labels are available
- Form #9141 Rev 5-15 as shown in **Figure 1**. This form can be ordered through e-catalog or e-forms.)
- OR
- Apply an **orange** wraparound cable marker. There is one size for #2/0 S/C 0455743 (**Figure 2**) and one for size #4/0 S/C 0455744 (**Figure 3**)
- 2.3.3 For both types of labels
- Fill in the data requested by the label. Note: The wraparound cable markers will allow the TPG(s) to be returned to the owner if left behind during storms or off property locations.
  - Apply a piece of transparent tape over the label to maintain its legibility.



The image shows a yellow rectangular label with rounded corners. The text on the label is as follows:

**Eversource**  
**Grounds**

\_\_\_\_\_ Dept/CCC

\_\_\_\_\_ Test #      \_\_\_\_\_ Test Date

9141 REV. 5-15

**Figure 1: Sample Test Label**  
(Form # 9141 Rev 5-15)

Connecticut Light & Power  
PROP OF \_\_\_\_\_ O/H LINES  
SER/TRUCK # \_\_\_\_\_ TESTED \_\_\_\_\_  
(TEST VALID FOR 2 YEARS)

**Figure 2: Sample 2/0 Cable Wraparound Label**  
(Stock Code 0455743)

Connecticut Light & Power  
PROP OF \_\_\_\_\_ ELECTRICAL MAINTENANCE  
TEST # \_\_\_\_\_ TESTED \_\_\_\_\_  
(TEST VALID FOR 2 YEARS)  
TRUCK # \_\_\_\_\_  
LIVE -LINE TOOL TEST

**Figure 3: Sample 4/0 Cable Wraparound Label**  
(Stock Code 0455744)

**End of Section**



### 3. SUMMARY OF CHANGES

Changes to TD Procedures are controlled by TD 001 “Writing, Revising, and Publishing Transmission & Distribution Procedures.”

#### **Revision 0 – Effective Date 12/17/2010**

- Initial issue

#### **Revision 1 – Effective Date 02/29/2012**

- Updated SME
- Updated Section 1.3 References to include M4-WP-3102, M4-WP-3104, SBST-07-07, and updated number of TD856 to M8-MT-3003
- Removed Section 2.2 Test Preparation since this information is now part of WP-3102 & WP-3104
- Updated Section 2.2 (formerly Section 2.3) to reference WP-3102 & 3104
- Updated Section 2.3.2 for new labels to be used
- Removed Attachments 3-4 since they are now part of WP-3102 & 3104
- Updated Attachment 2 (formerly Attachment 5) to correct stock code numbers for Chance Test Set

#### **Editorial Change – Effective Date 11/1/2013**

- Updated Section 1.3 – Development References and Supporting References paragraph title for the Code of Federal Regulations Title 29 CFR 1910. Renamed from “Protective Grounding Equipment” to “Grounding for the Protection of Employees”

#### **Editorial Change – Effective Date 6/18/15**

- Updated to Eversource template
- Updated Section 1.3 Development References ASTM F855-09 to ASTM F855-14
- Updated Section 1.3 Development References ASTM F 2249-03 to ASTM F 2249-03 (2009)
- Section 2.3.3 updated Figure 1 Sample Test Label with latest revision.

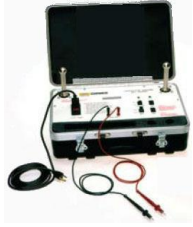




# Attachment 1

## Definitions

(Sheet 1 of 1)

**Temporary Protective Ground** (*Temporary Protective Ground Assembly, Portable Grounds, Worker's Grounds*) – grounding cable with connectors and ground clamps installed temporarily on de-energized electric power circuits or equipment for the purpose of conducting short circuit current and limiting ground potential rise in the event of inadvertent re-energization.

## Attachment 2 Approved Temporary Protective Ground Test Sets and Accessories

DESCRIPTION	MFG	CATALOG NUMBER	STOCK CODE	ILLUSTRATION
<b>TESTER, GROUND SET</b> , for testing protective grounds, 2 troubleshooting probes, 2 ball-stud terminals, self-test cable	A.B. Chance	C403-3220	0443176	
Straight stud terminal, for testing Grounded-Parking-Stand TPGs		C403-3449	0435439	
Adapter for testing TPGs equipped with a URD elbow		T403-3159	0435438	
<b>TESTER, GROUND SET</b> , for testing protective grounds, with copper connection bar	Hastings	6714	0443177	
Test bar for TPGs equipped with Grounding Elbows		6714-3	0443178	
Test bar for TPGs equipped with ball-socket clamps		6714-4	0443180	