

SINGLE SOURCE SAFETY DOCUMENT

CHAPTER 20

GENERAL ELECTRIC SAFETY

20-1. GENERAL: Electrical safety is paramount. Working with electricity can be dangerous. Engineers, electricians, and other professionals work with electricity directly, including working on overhead lines, cable harnesses, and circuit assemblies. Others, such as office workers, volunteers or contractors, work with electricity indirectly and may also be exposed to electrical hazards. Strange as it may seem, most fatal electrical shocks happen to people who should know better. Here are some electromedical facts that should make you think twice before taking chances. It's not the voltage but the current that kills. People have been killed by 100 volts AC in the home and with as little as 42 volts DC. The real measure of a shock's intensity lies in the amount of current (in milliamperes) forced through the body. Any electrical device used on a building wiring circuit can, under certain conditions, draw a fatal amount of current.

20-2. RESPONSIBILITIES: Commanders, Supervisors, and Managers will ensure their employees are briefed and aware of all electrical hazards in their areas of responsibility. Employees must understand electrical hazards can cause burns, shocks and electrocution (death). In addition, an Energized Electrical Work Permit (Figure 20-1) is required anytime electrical work is done on systems of 50 volts or greater and not being fully locked/tagged out. Lockout/tagout policy can be found in Chapter 9 – Lockout/Tagout Program SSSD. Permits must be staffed through the Directorate of Public Works-O&M Division and approved by the DPW COR for RBS. Ensure employees understand the following:

- Assume that all overhead wires are energized at lethal voltages. Never assume that a wire is safe to touch even if it is down or appears to be insulated.
- Never touch a fallen overhead power line. Call the Directorate of Public Works at 718-630-4931 or the Directorate of Emergency Services at (718)-630-4357 to report fallen electrical lines.
- Stay at least 10 feet (3 meters) away from overhead wires during cleanup and other activities. If working at heights or handling long objects, survey the area before starting work for the presence of overhead wires.
- If an overhead wire falls across your vehicle while you are driving, stay inside the vehicle and continue to drive away from the line. If the engine stalls, do not leave your vehicle. Warn people not to touch the vehicle or the wire. Call the Directorate of Public Works at 718-630-4931 or the Directorate of Emergency Services at (718)-630-4357 to request assistance.
- Never operate electrical equipment while you are standing in water.
- Never repair electrical cords or equipment unless qualified and authorized.

- Have a qualified electrician inspect electrical equipment that has gotten wet before energizing it.
- If working in damp locations, inspect electric cords and equipment to ensure that they are in good condition and free of defects, and use a ground-fault circuit interrupter (GFCI).
- Always use caution when working near electricity.
- When using ladders, always check the area to ensure you are not encroaching on electrical wires or there sources.

20-3. REFERENCES.

- a. 29 CFR 1910
- b. AR 350-10
- c. DA PAM 385-26

Figure 20-1

Fort Hamilton Energized Electrical Permit

An Energized Electrical Work Permit is required anytime electrical work is done on systems of 50 volts or greater and not being fully locked/tagged out. Permits must be staffed through the Directorate of Public Works-O&M Division and approved by the DPW COR for RBS.

Preliminary Information

Project information should outline what work is to be done and why it needs to be done without lockout/tagout. This information should be completed by the people that will do the energized work. The requestor is the person wanting the work done, such as the facility manager, the project manager, the shop foreman, etc. The requestor's signature is not required, but the requestor will be aware of the information.

Requester: _____ Work Request #: _____

Date: _____

Description of Work: _____

Circuit Information: Location: _____

Equipment: _____

Date/Time Work is Planned to Occur: _____

Reason equipment/circuit(s) cannot be locked out (include attachment, if necessary):

Consequences of unexpected fault or loss of power while energized work is in progress: _____

Requester of energized work (e.g., building occupant, facility manager, project manager, foreman, etc.): _____

Name & Title: _____ Signature: _____ Phone: _____

REQUIRED: Directorate of Public Works-O&M Division-COR: Approval of reason to allow work to be done while energized: _____

Approve: Disapprove: Name/Title: _____ Signature: _____

Approve: Disapprove: Name/Title: _____ Signature: _____

Figure 20-1 (Cont)

Fort Hamilton Energized Electrical Permit

Details of Work

The details of the energized work should be completed by a qualified person that will be doing the work. Workers must be fully trained, briefed, equipped and understand the procedures to be followed.

Detailed description of work to be performed: _____

Description of safety work practices to be followed:

Shock Protection Boundary: ____ Flash Protection Boundary: _____ Flash Protection Hazard Category: ____

PPE required: _____

Means of restricting access to work area: _____ Job Briefing Completed: _____

Shock Protection Boundary: ____ Flash Protection Boundary: _____ Flash Protection Hazard Category: ____

PPE required: _____

Means of restricting access to work area: _____ Job Briefing Completed: _____

Qualified worker(s): Are adequate worker safety precautions in place and being followed?;

Name & Title: _____ Signature: _____

Name & Title: _____ Signature: _____

REQUIRED: Approver (e.g., electrically qualified General Foreman or other electrically qualified manager):

All energized work permits must be reviewed and approved by two qualified persons, at least one in a managerial position, before work can begin.

Approve: Disapprove: Name/Title: _____ Signature: _____

Close Permit: Each permit is for a specific location, time frame, and task. Once work is complete, each permit must be closed out. Any incidents, unexpected occurrences or deviations from regular work practices will be noted and discussed with the workers doing this work and their supervisors.

Name & Title: _____ Signature: _____

****Submit a copy of the completed permit to the Fort Hamilton Safety Office, Bldg 137C Poly Place, Suite 2E, Brooklyn, NY 11252.**

Figure 20-1 (Cont)

Fort Hamilton Energized Electrical Permit

Approach Distance Boundaries

| Nominal System Voltage Range, Phase to Phase | Limited Approach Boundary: Exposed Movable Conductor | Limited Approach Boundary: Exposed Fixed Circuit Part | Restricted Approach Boundary; Includes Inadvertent Movement Adder | Prohibited Approach Boundary | Default Arc-Flash Protection Boundary (if no arc-flash analysis is available)† |
|----------------------------------------------|------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------------|------------------------------|--------------------------------------------------------------------------------|
| 50 to 300 V | 10 ft 0 in. | 3 ft 6 in. | Avoid contact | Avoid contact | 4 ft 0 in. |
| 301 to 750 V | 10 ft 0 in. | 3 ft 6 in. | 1 ft 0 in. | 0 ft 1 in. | 4 ft 0 in. |
| 751 V to 15 kV | 10 ft 0 in. | 5 ft 0 in. | 2 ft 2 in. | 0 ft 7 in. | 4 ft 0 in. |

† assumes supply transformer sized at less than 300 kVA with over-current interrupting devices.

Arc-Flash Protection Levels:

| Arc Flash Protection Level | Description of clothing components | Min. Rating |
|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| Level A: Basic work clothing for elect. qual. workers (equivalent to NFPA 70E 2004 hazard category 0) | natural fiber long sleeve shirt; natural fiber long pants; natural fiber undergarments; safety glasses; and electric hazard rated safety shoes | 1.2 cal/cm ² |
| Level B: Protection for electrically qualified workers* (equivalent to NFPA 70E 2004 hazard category 2) | basic work clothing (Level A) plus: fire resistant coveralls rated to at least 8 cal/cm ² ; voltage rated gloves; hard hat*; arc-flash rated face shield*; and hearing protection* | 8 cal/cm ² |
| Level C: Protection for electrically qualified workers (equivalent to NFPA 70E 2004 hazard category 4) | basic work clothing (Level A) plus: fire resistant coveralls w/ double layer switching hood rated to at least 40 cal/cm ² (i.e., a complete arc flash suit); and hearing protection | 40 cal/cm ² |

* Some tasks that require Level B Protection do not require an arc-flash rated face shield, hard hat and hearing protection.

Example tasks with acceptable PPE requirements (for more information contact your foreman or supervisor):

| Task (Assumes Equipment Is Energized, and Work Is Done Within the Flash Protection Boundary) | Flash Protection | V-rated Gloves | V-rated Tools |
|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------|---------------|
| Panel boards Rated 240 V and Below — Note 1 and Note 3 | | | |
| Circuit breaker (CB) or fused switch operation with covers on | A | No | No |
| CB or fused switch operation with covers off | A | No | No |
| Work on energized parts, including voltage testing | B# | Yes | Yes |
| Remove/install CBs or fused switches | B# | Yes | Yes |
| Removal of bolted covers (to expose bare, energized parts) | B# | No | No |
| Opening hinged covers (to expose bare, energized parts) | A | No | No |
| Panel boards or Switchboards Rated >240 V and up to 600 V (with molded case or insulated case circuit breakers) — Note 1 and Note 3 | | | |
| CB or fused switch operation with covers on | A | No | No |
| CB or fused switch operation with covers off | B# | No | No |
| Work on energized parts, including voltage testing | B | Yes | Yes |
| 600 V Class Motor Control Centers (MCCs) — Note 2 (except as indicated) and Note 3 | | | |
| CB or fused switch or starter operation with enclosure doors closed | A | No | No |
| Reading a panel meter while operating a meter switch | A | No | No |
| CB or fused switch or starter operation with enclosure doors open | B# | No | No |
| Work on energized parts, including voltage testing | B | Yes | Yes |
| Work on control circuits with energized parts 120 V or below, exposed | A | Yes | Yes |
| Work on control circuits with energized parts >120 V, exposed | B | Yes | Yes |
| Insertion or removal of individual starter "buckets" from MCC — Note 4 | C | Yes | No |
| Application of safety grounds, after voltage test | B | Yes | No |
| Removal of bolted covers (to expose bare, energized parts) | B | No | No |
| Opening hinged covers (to expose bare, energized parts) | B# | No | No |
| Other 600 V Class (277 V through 600 V, nominal) Equipment — Note 3 | | | |
| Lighting or small power transformers (600 V, maximum) | — | — | — |
| Removal of bolted covers (to expose bare, energized parts) | B | No | No |
| Opening hinged covers (to expose bare, energized parts) | B# | No | No |
| Work on energized parts, including voltage testing | B | Yes | Yes |
| Application of safety grounds, after voltage test | B | Yes | No |

Figure 20-1 (Cont)

Fort Hamilton Energized Electrical Permit

B# means that an arc-flash rated face shield, hard hat & hearing protection are not required for this task. Other Level B protection is required

Notes:

1. 25 kA short circuit current available, 0.03 second (2 cycle) fault clearing time.
2. 65 kA short circuit current available, 0.03 seconds (2cycles) fault clearing time.
3. For < 10 kA short circuit current available, the hazard/risk category required may be reduced by one number.
4. 65 kA short circuit current available, 0.33 second (20 cycle) fault clearing time.

AMBULANCE & FIRE

Directorate of Emergency Services/ Fire – 718-630-4357

Alternate – 911

Directorate of Public Works-O&M Division – 718-630-4931

Installation Safety Office – 718-630-4232