National Electric Safety Code (NESC)-2012 Arc Flash Updates

Pam Tompkins, CSP, CUSP, CUSA
President
SET Solutions, LLC
Lexington, SC
• 2012 Code published August 1, 2011
• Each state is responsible for adopting the latest edition of the code
  • MOST STATES DO – IN SOME FASHION
  • SOME STATES DO NOT
Is the NESC a Legal Document?

- The NESC is a **voluntary standard**.
- Some editions and some parts of the Code have been adopted, with and without changes, by some states and local jurisdictional authorities.
Please note that while OSHA does not enforce national consensus or industry standards directly, OSHA may consider such standards, including the National Electrical Safety Code (NESC), published by the Institute of Electrical and Electronic Engineers, Inc., when determining whether a hazard is "recognized" and whether there is a feasible means of abating such a hazard.
NESC-2012

- Rules for founded upon the fundamental principles used for safety of utility facilities
- NESC is not intended as a design specification or an instruction manual
- *NESC is globally accepted as good engineering practices*
NESC Revision Cycle

• The NESC is revised every 5 years

• NESC-2017 schedule
  – July 15, 2013- Final date to receive change proposals
  – September- October 2013- Committees meet and consider change proposals
  – September 2014- Proposed amendments printed. **Comment period opens.**
  – May 2015- Committee study period and comments- **Comments due**
  – October 2015- Committees prepare final report
  – January 2016- Proposed revision of NESC to NESC committee for letter ballot.
  – May 2016- Committee approved revisions submitted to ANSI for recognition as an ANSI standard
  – **August 2016- Publication of the 2017 Edition of the NESC**
NESC

- Divided into one section and four (4) parts:
  - Section 9- Grounding methods for electric supply and communication facilities
  - Part 1- Electric supply stations
  - Part 2- Safety rules for overhead lines
  - Part 3- Safety rules for underground lines
  - Part 4- Work rules
Supporting Comments
Subcommittee 8

- Established a low-voltage arc flash work group (WG).
  - Evaluate minimum clothing or clothing system requirements for employees working on voltages less than 1000 volts.
- PG&E completed tests during 2008 to determine the arc flash characteristics of 480 V self-contained metering equipment by creating fault conditions at various kA levels.
  - WG collaborated with PE&G on tests.
Supporting Comments

Subcommittee 8

• The new table (410-1) uses an 18 inch worker separation.
  – Unlike the existing higher voltage tables which uses a 15 inch worker separation.

• The WG committee based the change on the application of IEEE 1584 test methodologies and typical working distances for low-voltage motor control centers and panel boards.

• The employee working distance is based on the incident energy on the worker’s face and body not on the hands and arms.
A. General 3.

- Requires each employer to perform an arc hazard assessment for employees who work on or near energized lines, parts or equipment at 50V to 800 kV.
410. A. General 3a.

- Requires employers to determine the effective arc rating of clothing or clothing systems to be worn by employees working on or near energized lines, parts, or equipment at voltages 50V-800 kV by one of the following methods:
  - Perform a detailed arc hazard analysis
  - Use tabulated values in tables provided.
    - Table 410-1 (50V-1000V)
    - Table 410-2 (1.1kV-46kV)
    - Table 410-3 (46.1kV-800kV)
# Table 410-1

Clothing and clothing systems for voltages 50-1000V

<table>
<thead>
<tr>
<th>Equipment type</th>
<th>Nominal voltage range and cal/cm(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50-250 V</td>
</tr>
<tr>
<td>• <strong>Self–contained meters/cabinets</strong></td>
<td>4</td>
</tr>
<tr>
<td>• <strong>Pad-mounted transformers</strong></td>
<td>4</td>
</tr>
<tr>
<td>• <strong>CT meters and control wiring</strong></td>
<td>4</td>
</tr>
<tr>
<td>• <strong>Metal-clad switchgear/motor control centers</strong></td>
<td>8</td>
</tr>
<tr>
<td>• <strong>Pedestals/pull boxes/hand holes</strong></td>
<td>4</td>
</tr>
<tr>
<td>• <strong>Open air (includes lines)</strong></td>
<td>4</td>
</tr>
<tr>
<td>Equipment type</td>
<td>50-250 V</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>• Network protectors</td>
<td>4</td>
</tr>
<tr>
<td>• Panel boards - single phase (all)/three phase (&lt;100A)</td>
<td>4</td>
</tr>
<tr>
<td>• Panel boards - three phase (&gt;100A)</td>
<td>4</td>
</tr>
</tbody>
</table>
Updated Tables

- Table 410-2- Clothing and clothing systems- voltage, fault current and maximum clearing times for voltages 1.1 kV to 46 kV ac
- Table 410-3- Live-line tool work clothing and clothing systems- voltage, fault current and maximum clearing time for voltages 46.1 kV to 800 kV ac
  - Major changes throughout the table
410. A. General 3b.

- Wording change:
  Ensure acetate, nylon, polyester or polypropylene is not worn unless the material is arc rated
• Added Note 1: Assessments performed to determine potential exposure to an electric arc consider the affected employee’s assigned tasks and/or work activities.
410. A. General 3b.

- **Changed original Note 1 to Note 2-**
  - Added *natural fiber* to *non-flame resistant material.*
410. A. General 3b.

- **Changed original Note 2 to Note 3 - Added**
  - Utilizing engineering controls to reduce arc energy levels and work practices to reduce exposure levels.
For more information contact us at

SET Solutions, LLC
www.setsolutions.co
803-407-4707
Pamela (Pam) T. Tompkins, CSP, CUSP, CUSA
President

710 East Main Street
Lexington, SC 29072
(803) 407-4707
Mobile (803) 917-1537
ptompkins@setsolutionsllc.com
www.setsolutionsllc.com