ALSO INSIDE

ICC’s High School Technical Training Program Continues to Grow and Succeed
Access Equalizer: Video Technology Assists the Deaf and Hard of Hearing in Emergencies
Corrugated Stainless Steel Tubing’s Ability to Withstand Lightning Strikes
At its October meeting, held during the International Code Council (ICC) Annual Business Meeting in Kansas City, Mo., the Fire Service Membership Council (FSMC) unanimously supported the National Association of State Fire Marshal’s (NASFM) effort to educate the public on technical advances in Corrugated Stainless Steel Tubing (CSST).

This tubing has been used to distribute natural gas throughout homes and businesses across America. With permission from NASFM, we are publishing a white paper distributed in July 2016 explaining the difference between the product’s ability to withstand an indirect lightning strike vs. a direct strike. NASFM believes the more stringent ICC Evaluation Service PMG LC1027 listing criteria should be used in the development of this product.

Furthermore, the Lightning Protection Institute (LPI) is partnering with NASFM to help improve safety measures for CSST and its susceptibility to lightning-related fires. NASFM has a campaign underway to reduce the number of these fires, and LPI has joined the effort.

Both groups believe safety can be achieved through the adoption of an improved performance criteria for flexible gas piping established by the ICC-ES PMG LC1027, now available for installation in new homes.
For those not familiar with ICC-ES, we asked Rob Neale, ICC Government Relations Vice President for National Fire Service Activities, how ICC-ES benefits code officials.

“The complexity of evaluating products for safety can be a daunting task for the code official,” said Neale. “Fortunately, one of ICC’s Family of Companies—the ICC Evaluation Service—asseses many of these products and provides Evaluation Reports describing where specific products may be used to comply with one or more of the International Codes. This helps the code official have confidence products installed have been evaluated to meet safety standards.”

See the referenced white paper below.

**Comparison of Protective-Jacketed CSST Listing Tests**

Over time, new technology and research bring advances to products we use every day. Such is the case with the newest categories of electrical arc-resistant Corrugated Stainless Steel Tubing (CSST), sometimes referred to as black CSST. CSST is used in flexible gas piping systems that convey natural gas and propane throughout residential and commercial structures.

The first advance in this area was the development of semi-conductive, black plastic-jacketed CSST. These products have been available for a number of years and are listed to the 4.5 coulomb (electrical charge) listing test of the ICC-ES PMG LC1024, and the ANSI LC 1, sec. 5.16 (optional test section). These tests establish the plastic jacket’s ability to protect CSST from indirect lightning threats, and also recognize this approach as providing at least the equivalent safety benefit as provided by direct-bonding of standard yellow CSST. These tests however, do not evaluate CSST for the threats of electrical arcing associated with direct lighting or household electrical system faults.

With an understanding that higher electrical charge lightning events can damage systems in a home, a stronger electrical arcing test was developed in 2011. The ICC-ES PMG LC1027 listing criteria subjects protective jacketed CSST products to 36 coulombs of electrical arcing charge, eight times higher than the charge used in the ANSI LC 1 test,
Corrugated Stainless Steel Tubing’s Ability to Withstand an Indirect vs. a Direct Lightning Strike continued

and high enough to simulate the 50th percentile of negative lightning flashes measured at ground.*

Even with more stringent test criteria, no rigid or flexible gas piping products are guaranteed impervious to the potentially destructive and unpredictable power of the full range of lightning strikes.

Table 1 below contains a comparison of key elements of the electrical arcing tests and listings used by the CSST industry.

Table 1. Key elements of the electrical arcing tests and listings used by the CSST industry

<table>
<thead>
<tr>
<th>Basis for Test</th>
<th>ICC-ES PMG LC1024</th>
<th>ANSI LC 1 Sec.5.16 (Optional)</th>
<th>ICC-ES PMG LC1027</th>
</tr>
</thead>
<tbody>
<tr>
<td>minimum Peak Current</td>
<td>1,000 Amp</td>
<td>1,000 Amp</td>
<td>30,000 Amp</td>
</tr>
<tr>
<td>Test Charge</td>
<td>4.5 Coulombs</td>
<td>4.5 Coulombs</td>
<td>36 Coulombs</td>
</tr>
<tr>
<td>Waveform</td>
<td>Induced Current waveform</td>
<td>Induced Current waveform</td>
<td>Composite waveform representing lightning currents</td>
</tr>
</tbody>
</table>

"Informed from SAE ARP5412B Aerospace Recommended Practice, "Aircraft Lightning Environment and Related Test Waveforms."

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George Michehl is a member of Code Council’s Fire Service Membership Council Governing Committee representing the Great Lakes Division of the International Fire Chiefs. He is past President and Executive Director Emeritus of the Illinois Fire Inspectors Association and Retired Deputy Fire Marshal from the Buffalo Grove Fire Dept. Michehl currently works with Fire Safety Consultants, Inc., in Elgin, Ill., as a code consultant.