TITLE: Issues with ANSI/SPRI ES-1

DESIGNATION: IIBEC-TA-003-2013

OBJECTIVE: To provide commentary regarding issues associated with the ANSI/SPRI ES-1 standard.

A. BACKGROUND

In 1998, ANSI/SPRI developed ES-1, "Wind Design Standard for Edge Systems Used with Low-Slope Roofing Systems." The design standard addressed copings and horizontal roof edges, and the following factors were to be considered when designing roof edges: Structural integrity of the substrate that anchors the edge (i.e., nailers), wind resistance of the edge detail, and materials specifications.

In 2003, the International Building Code (IBC) adopted the 1998 version of the standard, addressed in Chapter 15, paragraph 1504.5, "Edge Securement for Low-Slope Roofs."

> Low-slope membrane roof systems' metal edge securement, except gutters, installed in accordance with Section 1507, shall be designed in accordance with ANSI/SPRI ES-1, except the basic wind speed shall be determined from Figure 1609.

The 2006 IBC again referenced ANSI/SPRI ES-1, 2003 version, but the language in Chapter 15, paragraph 1504.5, "Edge Securement for Low-Slope Roofs," was slightly different than the 2003 IBC. The 2006 IBC states:

> Low-slope membrane roof systems' metal edge securement, except gutters, shall be designed and installed for wind loads in accordance with Chapter 16 and tested for resistance in accordance with ANSI/SPRI ES-1, except the basic wind speed shall be determined from Figure 1609.

The ES-1 Standard states the following:

> Edge details may be selected from the manufacturers who certify certain minimum performance to meet design requirements, based upon testing. Other designs may be used, provided they are tested and certified by an independent testing laboratory to meet the wind and pullout resistance design standards suggested in this document.

The 2006, 2009, and 2012 editions of the IBC require compliance with the ANSI/SPRI ES-1 standard. They have been adopted by a majority of the code enforcing bodies throughout the United States and have become the basis for building design.

B. COMPLIANCE/CODE CONFORMANCE

There are several methods by which the edge metal can comply with the current standard. They are as follows:

- Manufacturers who have designed and tested proprietary premanufactured edge metal and coping systems in accordance with ANSI/SPRI ES-1 standards

- National Roofing Contractors Association (NRCA) ANSI/SPRI ES-1 tested details available at www.nrca.net. Contractor sublisting required by NRCA in order to properly use these details.

- Sheet Metal and Air Conditioning Contractors National Association (SMACNA) ANSI/SPRI ES-1 tested details available in the *SMACNA Architectural Sheet Metal Manual* and at www.smacna.org

- Designed, shop-fabricated edge metal and coping profiles that have been tested by independent testing laboratories in accordance with ANSI/SPRI ES-1

- Underwriters Laboratories Inc. (UL) ANSI/SPRI ES-1 certified metal edge systems. UL certifies these roof edge systems under the product category "Roof-Edge Systems, Metal, for Use with Low-Slope Roofing Systems (TGJZ)."

C. ISSUES

- Contractor-certified fabricators/installers only: The contractors that have implemented and maintained the quality control (QC) process utilizing the independent audits and control protocols established by the process are able to install the sheet metal fabrications as a sublisting to NRCA-tested assemblies. Those contractors that do not implement the QC protocols do not meet the criteria and guidelines established by this standard.

- Limits design creativity: Since there are a limited number of tested fabrications, a designer is somewhat limited to using one of these predetermined components and making it work with a proposed new construction or with existing conditions. The other available option is developing an original design, producing a prototype, and having it tested by an independent laboratory.

- Limited applications and flexibility with existing building conditions: Existing buildings with unusual or atypical conditions and/or features along the perimeters of roofs traditionally do not lend themselves to the application of predesigned sheet metal fabrications. Again, this option would involve the time and expense of developing a prototype and having it tested by an independent laboratory.

- Eliminates engineered design: The requirement to adhere to specific criteria and testing protocols can eliminate the ability of an individual to design sheet metal edge flashings and the attachment thereof based on known physical characteristics of building materials and to analyze the designed assembly in engineering load diagrams without the need to perform the required testing.

- Past performance of "tested/approved" systems: There have been applications where "tested" assemblies that met the applicable standards were installed and subjected to elevated wind forces and did not perform as expected. The source of the failure may have been due to issues related to the dimensional characteristics associated with field measuring and/or the actual installation of the components where the as-built conditions did not conform to the laboratory conditions. Since many of the tested fabrications rely on interlocking and/or snapped-on components, variations in the dimensional limitations could result in less-than-desirable performance.

- Areas not located in hurricane-prone regions or high-wind zones: A large portion of the United States is not located within hurricane-prone regions or high-wind zones, and the requirement for the edge metal to meet these standards may be considered somewhat excessive and may not be the most cost-effective and practical solution. It would appear that fabricating and installing sheet metal edge flashings in accordance with established industry standards, such as SMACNA and NRCA, that have not been through the testing protocols have provided proven serviceable solutions without failures for those buildings located outside of the subject areas.

D. SUMMARY AND CONCLUSIONS

While it is understood that ANSI/SPRI ES-1 standard was developed for the betterment of the design, installation, and performance of perimeter edge metal systems and currently is included in the building code that has been adopted by most, the actual guidelines and specific requirements may not be that critical or necessary for all buildings at all geographic locations. The applicability, overall financial impact, and potential risks of these requirements should be reviewed by both the building owner and the designer.