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## **COLLECTION VOLUME METHOD OVERVIEW**

ERICO International Corporation and companies it has acquired have been dedicated to the development of lightning protection (LP) products and systems for over 100 years. With our breadth of products and experience in the LP arena, we have a unique perspective and understanding of the worldwide markets and standards as they relate to LP.

ERICO is not in agreement with every LP design standard and product in the market, but our overall goal is to utilize a best practice approach for a given application while optimizing air terminal placement. By “best practice”, the LP system achieves the desired level of protection and safety for the customer. The best practice approach may require a conventional LP system, a non-conventional LP system, or potentially a hybrid design utilizing components of each. Any design method may be used in varying degrees in Codes of Practice, such as the Cone of Protection, Mesh and Rolling Sphere methods

Over 15 years ago, ERICO developed the System 3000, a proprietary lightning protection system based on the Collection Volume Method (CVM) of protection. The success of the System 3000 (over 15,000 installations) has led to contempt by a number of our competitors because they do not want to understand the real advances made through research and development in both product and LP design.

The CVM is an enhanced electro geometric modeling (EGM) analysis and can be applied to any LP design methodology. The rolling sphere method described in EN 62305-3 is based on the simplified EGM analysis. The CVM applies a “receptive co-efficient” for each point on the structure. It defines the probability of that point being intercepted by lightning. Although similar, to the rolling sphere method mentioned above, the CVM also employs additional lightning parameters in its striking distance formula by taking into account such parameters as humidity, elevation (height above sea level) and other atmospheric effects including the velocity ratio of the lightning downleader to the upleader (streamer). The complexity of the CVM formula dictates that these calculations of protection radii be done using a computer.

The CVM design produces more conservative results than the Rolling Sphere Method (RSM) for low level structures and the existing NFC17-102 ESE time based placement method. For taller structures, the CVM produces greater protective areas compared to the rolling sphere design method. The CVM produces an optimized design model that often provides an alternative solution to unnecessarily expensive designs, difficulty in achieving full compliance with standards by the lightning protection consultant, and overcoming certain practical problems for the installer.

In conclusion, the CVM is a valid method for the placement of air terminals. It is the only design method to be validated with field data for application to common, extended structures. The rolling sphere method has been validated for transmission lines, but never validated for application to common, extended structures.

For additional detail please see Franco D’Alessandro’s paper titled:

**“THE DEVELOPMENT OF THE THREE DIMENSIONAL “COLLECTION VOLUME METHOD” AS AN IMPROVED ELECTROGEOMETRIC MODEL FOR THE PROTECTION OF STRUCTURES”**