

Lightning Protection for Geodesic Domes



Most geodesic dome internal floating roof tanks do not meet the basic requirements for lightning protection contained in National Fire Protection Association NFPA 780, the US lightning protection standard.

The main problem is that they do not meet the minimum thickness requirements to prevent burn through from a direct lightning attachment. Therefore, air terminals (lightning rods) are required to protect the dome and tank.

After recent lightning strike incidents involving geodesic domes, a leading dome manufacturer asked Lightning Master to develop a system for geodesic domes that can be easily installed and maintained. This system consists of air terminals and bonding jumpers, and employs the tank structure as the conductor and grounding system. For certain types of domes it also includes a network of conductors to convey lightning current to the tank shell.

The Lightning Master system meets the requirements of NFPA 780 for air terminal placement and American Petroleum Institute API 545 and 2003 for grounding.



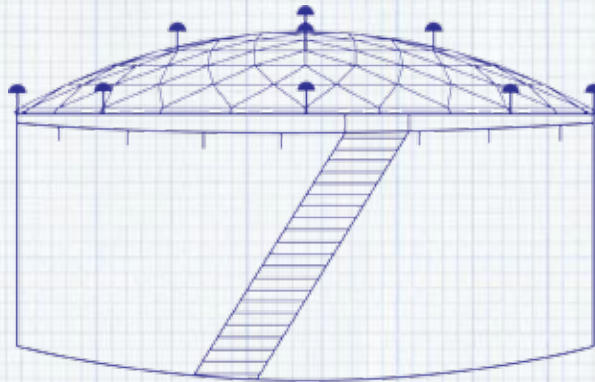
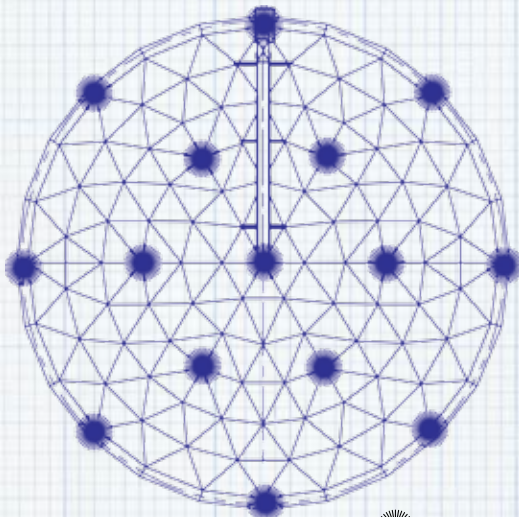
Lightning Master uses its streamer-delaying air terminals (SRAT) in place of Franklin lightning rods. The SRAT's are designed to help delay the formation of lightning completing streamers from a protected structure. They do this by dissipating the ground charge to atmosphere that would otherwise constitute a streamer through a multiplicity of small radius electrodes attached to the tip of the air terminal. In the event they become saturated and are unable to dissipate sufficient charge, they reliably revert to the mode of a conventional lightning rod and attract the strike. The lightning energy is then conveyed to ground through the tank structure, inherent self-grounding of flat-bottom steel tanks, and any supplemental conductors, jumpers or grounding.



Lightning strikes caused a fire at a major pipeline company's tank farm in North Carolina early Sunday morning, fire officials said. A tank holding about 20,000 barrels of gasoline — about half that tank's capacity — caught fire. **-CNN**



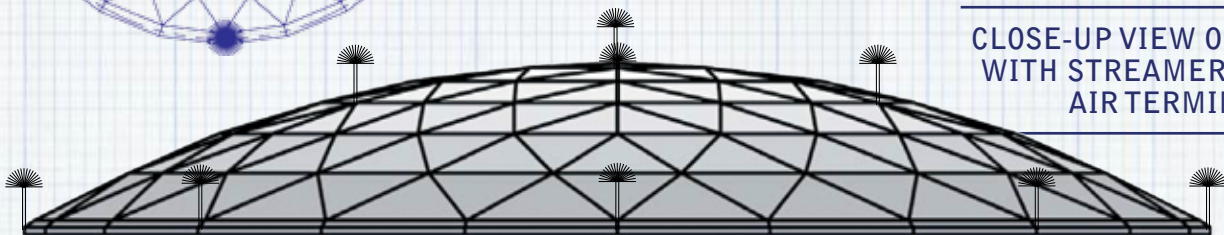
TOP VIEW OF DOME WITH STREAMER-DELAYING AIR TERMINALS



SIDE VIEW OF TANK & DOME WITH STREAMER-DELAYING AIR TERMINALS

(Not to scale)

CLOSE-UP VIEW OF DOME TOP WITH STREAMER-DELAYING AIR TERMINALS



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Gasoline storage tank caught fire after it was struck by lightning. Security cameras reveal that late in the brief storm a tremendous lightning strike came down in the area of the tank battery. There seems little doubt that the lightning hit the tank, with the electrical grounding system failing to prevent a fire. [-www.fireworld.com](http://www.fireworld.com)

A bolt of lightning struck a local gasoline storage tank, erupting into a wall of flames that leapt as high as 100 feet and belched a plume of smoke that billowed like an arch across eight lanes of interstate highway. The one critical factor that did not operate according to plan was an electrical grounding system that was supposed to draw lightning away from the gasoline tanks.

- www.news-record.com

"I've never seen a lightning bolt that thick, and it came straight down in the center of that tank, and it just like, it almost like, exploded"

-911 recording reported by WXII 12 News

"We're driving down I-40 and we just saw lightning strike one of the big tanks, and it caught fire"

-911 recording reported by WXII 12 News



Site Survey and Evaluation:

- Our field operations personnel will visit your site and create a report with findings and recommendations
- Based on our site survey and the requirements of NFPA 780, Underwriters Laboratories UL 96A, API 545 and API 2003, our UL trained personnel will design a system for your site.

Products:

- UL Listed Stainless Steel Bonding and Grounding Clamps
- Surge Protective Devices
- Structural Lightning Protection - UL Listed Air Terminals
- LMC In-Tank Static Drains (ITSD)
- Movable Arm Grounding System (MAGS) Bypass Conductors

Installation:

- LMC is a UL Certified Lightning Protection System Installer, and can perform your installation turn key
- Or - we will train and supervise your personnel to perform installations
- Or - we will train and supervise your preferred contractor(s) to perform installations

Continuing Inspection and Maintenance:

- LMC will provide inspection guidelines based on NFPA 780, Appendix D.
- We offer a periodic inspection program to check your tanks on a regular basis.

Customer Service:

- We help you write the specifications that meet industry standards and your specific needs
- UL Certified Lightning Protection System Installer
- Turn-key installation by Lightning Master-employed crews

To meet the intent of "best practices", Lightning Master also offers its movable arm grounding system (**MAGS**) bypass conductor with special rim brackets for use on internal floating roof, including geodesic dome, tanks.

Industry Leaders:

Lightning Master principals serve as members of the following standards writing committees:

- National Fire Protection Association NFPA 780
- American Petroleum Institute API 545 and 2003
- Underwriters Laboratories UL 96 STP