
Grounding and Bonding Solutions • Surge Suppression • Lightning Protection
ALLTEC®
SOLUTION PROVIDERS FOR AN ENERGIZED WORLD™

ALLTEC is an international full-service company specializing in engineered grounding/earthing & bonding solutions, surge/transient protection, and lightning protection.

Solution Providers for an Energized World™

ALLTEC®

What We Do

Since 1991, ALLTEC has been a leader in applying engineered solutions which reduce the risks associated with direct and indirect lightning strikes, as well as diminishing the hidden effects of surge events.



ALLTEC®

Quality - Comprehensive Quality Control To Ensure Total Success

ALLTEC is an ISO 9001:2008 Quality Management System Registered company.

Certificate of Registration

nqa global assurance

This is to certify that the Quality Management System of:

Alltec, LLC
64 Catalyst Drive
Canton, NC 28716

applicable to:

Engineering, manufacturing and distribution of lightning protection systems, grounding systems and surge protection devices to the oil and gas, telecommunications, military and industrial markets

has been assessed and approved by
National Quality Assurance, U.S.A., against the provisions of:

ISO 9001: 2008

Certificate Number: 12843
EAC Code: 19
First Issued: December 22, 2008
Valid Until: December 22, 2014
Reissued: May 3, 2013

For and on behalf of
NQA, USA, 4 Post Office Square,
Acton, MA 01720

ANAB

Page 1 of 1

This approval is subject to the company maintaining its system to the required standard which will be monitored by NQA, USA, an accredited organization under the ANSI-ASQ National Accreditation Board.

Customers are the center of our focus.

ALLTEC®

Quality Commitment - Manufacturing

ALLTEC is committed to providing customers with superior-quality services and products.

Our methods, while not always the least expensive option, result in industry leadership in:

- Customization
- Quality assurance
- Shortest lead times

Total quality management is embedded in ALLTEC's philosophy and corporate culture.

ALLTEC®

Who We Work With

ALLTEC®

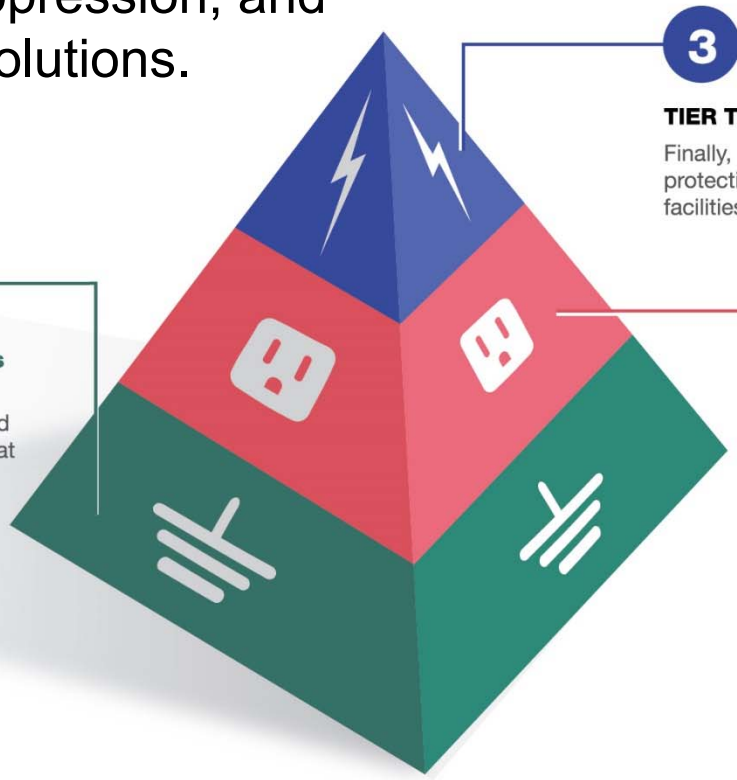
The ALLTEC Protection Pyramid™

Why the Pyramid?

ALLTEC®

The ALLTEC Protection Pyramid™

The ALLTEC Protection Pyramid™ provides a three-tier comprehensive facility approach for grounding/earthing & bonding, surge suppression, and lightning protection solutions.



3

TIER THREE | Lightning Protection

Finally, a well-designed, customized lightning protection system will be installed to safeguard facilities from direct lightning strikes.

2

TIER TWO | Surge Suppression

The second tier comes from properly installed surge protection devices, which reduce the magnitude of random, high energy, short duration electrical power anomalies.

1

TIER ONE | Grounding Solutions

The foundation tier begins with the design of a stable, low resistance and low impedance grounding system that directs harmful electrical currents safely to earth.

ALLTEC®

Systems Engineering and Products Solutions

Consulting, Engineering & Design, Project Management and Inspection/Preventative Maintenance Services

ALLTEC®

Engineering Services and Solutions

ALLTEC's Solutions for Our Clients:

- Protect critical facilities, equipment, records, and assets
- Provide a safe working environment for personnel
- Reduce the risk of downtime, lost revenue and productivity
- Reduce vulnerability of interdependent critical infrastructures for a disaster resilient enterprise

Consulting (Phase I)
TerraEval™ Advanced Solution Assessment

- Historical Analysis
- Site Plan Analysis and Zone Determination
- Establish Scope of Work
- Testing & Site Engineering Evaluation
- Data Analysis & Computer Modeling
- Review of Exisiting Drawings
- Risk Assessment
- Formal Report, Assessment of Compliance, Recommendations for Improvement

Engineering & Design (Phase II)

- Engineering & Design of Grounding and Lightning Protection Systems – Future State
- Design Optimization for Cost & Performance
- Design Validation
- Internal Review & Sign Off
- Client Approval
- Materials List & Specifications
- Material Supply of Standard & Custom Engineered Mechanical, Electrical and Electronic Devices
- UL Master Label Compliant Designs Certified by Master Designer/Installer Personnel

Project Management (Phase III)

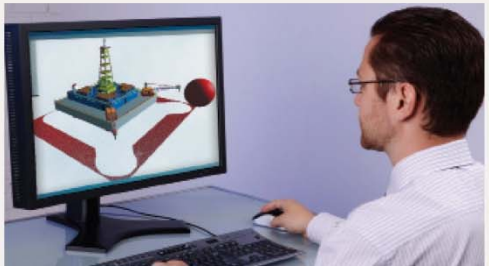
- General Oversight of All Project Related Activities
- Resource Procurement & Allocation
- Bidding Document Preparation
- Oversight of Project Execution
- Progress & Change Reporting
- Quality Control/Testing
- Maintenance Program Set-up & Training
- Project Closeout Management
- UL Master Label Compliant Installation

Inspection/Preventative Maintenance (Phase IV)

- Initial System Verification (if not installed by ALLTEC)
- Review Damage Caused by Weather/ Mechanical Separation/Theft
- Recommend Necessary Protection for Facility Additions or Changes in Use
- Provide Site Specific Reporting to Client or Governing Body
- Assist in Preparing Facility for UL Re-Inspection
- UL Master Label Recertification

You can learn more at www.alltecglobal.com/services






ALLTEC®

Standards & Code Specification Compliance

OFFERING COMPLIANCE TO:

- IEEE 80 & 81
- UL 96A
- NFPA 780
- LPI 175
- API 2003
- API 545
- IEC 62305
- UNE 21 186
- NF C 17-102
- Motorola R56
- UL 1449
- IEC 61643
- Customer-specific & other Specifications

ALLTEC®

Grounding / Earthing & Bonding Solutions

Tier One

ALLTEC®

ALLTEC's Grounding / Earthing & Bonding Solutions

TerraDyne®

Electrolytic Grounding System (EGS)

TerraFill®

Ground Enhancing Backfill

TerraWeld®

Exothermic Welding System

- Molds
- Weld Material
- Handles and Accessories

GroundGuardian®

Active Floating Roof Tank Monitoring System (FRTM) & Retractable Bypass Conductor (RBC)

ALLTEC®

Available Grounding / Earthing & Bonding Solutions

- Bus Bars
- Copper Ground Plates
- Bonding Jumpers
- Ground and Signal Reference Grids
- Copper Clad and Stainless Steel Ground Rods
- Compression Lugs and Tools
- Split Bolts and Bonding Lugs

ALLTEC®

TerraDyne® - Electrolytic Grounding System (EGS)

c UL us
LISTED

TerraDyne® (EGS) is a multipurpose grounding system which may be used for virtually any application where the protection of machinery, electronics, and personnel are important.

TerraDyne® - Electrolytic Grounding System (EGS)

PROTECT AGAINST

- Lightning
- Electrical Transients
- Static Discharges
- Electromagnetic Interference
- Other Electrical Hazards

TYPICAL APPLICATIONS

- Telecommunications
- Military
- Data Centers
- Oil & Gas

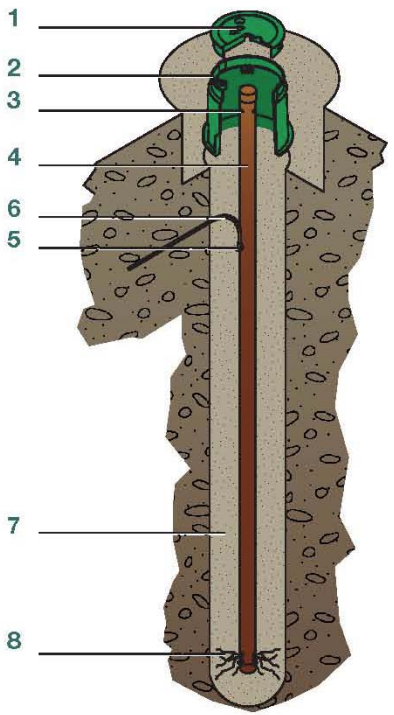
ALLTEC®

TerraDyne® - Features & Benefits

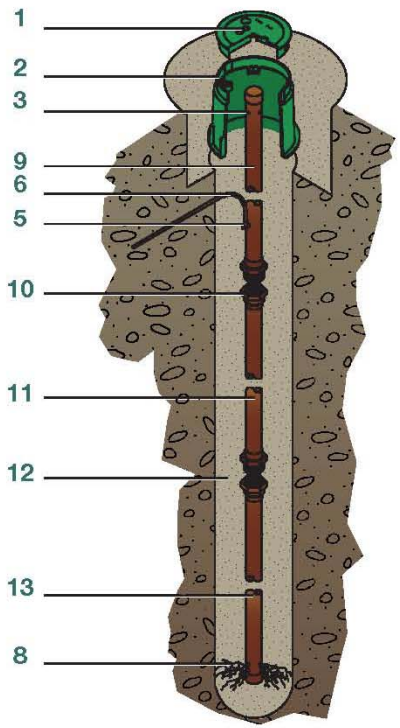
- Enhances Performance of Your Electronics
- Provides Ultra-low Resistance to Earth
- 24/7 Protection
- No Dependency on Ground Moisture
- Stabilizes Signal References
- Reduces the Risk of Injuries
- Exceptional Product Warranty

ALLTEC®

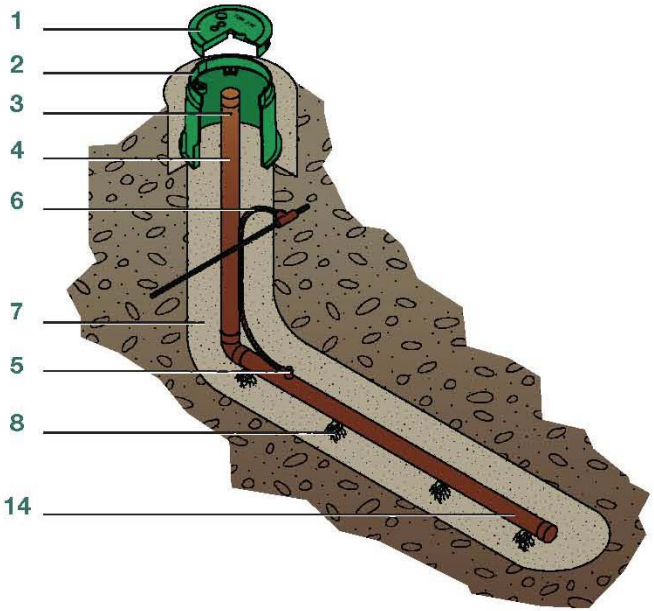
TerraDyne® - How It Works



VERTICAL MODEL **"S" Series**



VERTICAL MODEL **"Deep" Series**



HORIZONTAL MODEL **"L" Series**

TERRADYNE® SERIES KEY

1 Vented Cover	5 Exothermic Connection	9 20'-0" Upper Electrode Section	13 20'-0" Lower Electrode Section
2 Protective Test Well	6 Copper Conductor	10 Copper Coupler	14 Horizontal Shaft
3 Vent Ports	7 TerraFill® Backfill	11 20' Body Sections (Quantities Vary)	
4 Vertical Shaft	8 Electrolytic "Routes" and Leach Ports	12 TerraFill® Deep Series Backfill (TF-50DS)	

ALLTEC®

TerraFill® - Ground Enhancing Backfill

TerraFill® (Low Resistivity Grounding Backfill) provides a simple method of substantially lowering the earth resistance of grounding systems.

When used with copper grounding equipment, contact resistance to earth is lowered by **up to 63 %**.

ALLTEC®

TerraFill® - Features

- Produces lower surge impedance resulting in faster transient dissipation
- Manufactured to be compatible with copper grounding systems and standard field application methods
- Can be used in connection with grounding grids to minimize step and touch potentials
- Produces acceptable grounding impedance in high-resistivity soils, within a reasonably sized area

ALLTEC®

TerraFill® - Benefits

- Easily applied
- Excellent shelf life with long-term performance
- Versatile – Applying TerraFill® to lower the ground resistance of grounding equipment allows for a variety of earthing designs which might otherwise be impractical
- Self-compacting – comes in easily transportable 50 lb. (22.68 kg) bags, easily installed by one person

ALLTEC®

TerraFill® - Ground Enhancing Backfill

PERMANENT

- Will not dissolve or decay with time
- Requires no maintenance
- Maintains constant resistance for the life of the system

ENVIRONMENTALLY FRIENDLY

- Does not affect soil or ground water
- Meets all EPA requirements for landfill
- Material Safety Data Sheet (MSDS) available on request
- Restriction of Hazardous Substances (RoHS) compliant
- Motorola R56 compliant

ALLTEC®

TerraWeld® - Exothermic Welding System

The TerraWeld® Exothermic Welding System provides a superior solution via permanent molecular bonding.

ALLTEC®

TerraWeld® - Features

- Maintains current carrying capacity exceeding that of the conductors in the system (necessary for all lightning protection and grounding systems)
- Are the only connections that will not loosen or increase resistance over the lifetime of the installation
- Is the preferred connection method especially for below-grade connections

TerraWeld® - Benefits

- TerraWeld®'s system resistance, impedance and ampacity meet all challenges and deliver assurance for your company
- Pressure type connections are susceptible to variation, aging, corrosion and failure—not TerraWeld®
- Provides higher fusing capacity than conductors to which they're bonded
- Complies with all regulations for functionality and safety.
- Provides performance superior to all existing surface-to-surface mechanical retention connectors

ALLTEC®

Compliances

TerraWeld® is distributed internationally and meets or exceeds the standards for the following:

- UL 467
- IEEE 80, 837 and 1100
- NEC Article 250
- IEC 62305

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TerraWeld® - Exothermic Welding System

TYPICAL APPLICATIONS

- Cable-to-cable splices, tee connection, cross run connection, parallel connections, etc.
- Wire grid-to-ground rod, cable-to-rod, steel sheets and pipes and rod-to-rod splices
- Tap conductor-to-vertical/horizontal pipe, flat surface, or plate
- Through conductor-to-vertical/horizontal pipe, flat surface or plate
- Bus bar & wire-to-rail connections
- Solid or stranded cable, metal tape, re-bar, and terminal lug connections

COMPATIBLE WITH

- Copper
- Steel
- Columbium
- Bronze
- Iron
- Copper-clad steel
- Stainless steel
- Monel
- Niobium
- Brass
- Silicon bronze

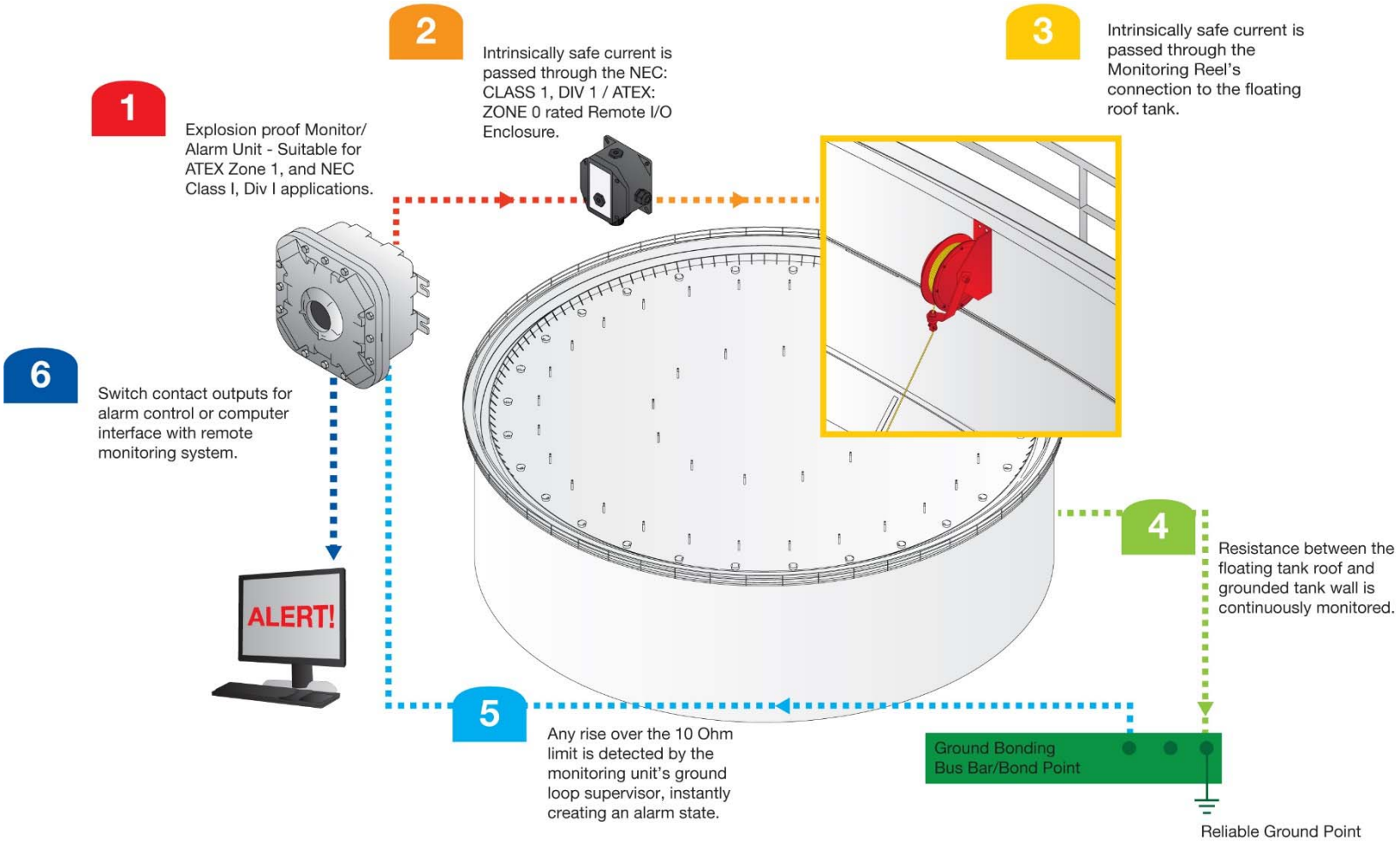
ALLTEC®

GroundGuardian® - Active Floating Roof Tank Monitoring System

The GroundGuardian® Active Floating Roof Tank Monitoring System, developed and patented by ALLTEC, alerting you to resistive changes in your roof-to-shell bond, maintaining a safe work environment, and reducing risks.

ALLTEC®

GroundGuardian® - How It Works



"24/7 Protection"

Understand the constant risk.

Enjoy the security of knowing you are protected by continuous, reliable monitoring.

ALLTEC®

GroundGuardian® - Features & Benefits

- Uses patented, innovative active monitoring technology to detect any change in resistance of the electrical bond between a floating roof and the storage tank's grounding system
- Continuously monitors the established ground loop for dangerous deviation in the bond resistance between the floating roof and the External Floating Roof Tank (EFRT)'s grounded shell, commonly caused by corrosion, wax accumulation, or breakage

Dry Relay Contact (DRC) Compatibility & Enclosure Ratings

The GroundGuardian® DRCs can be used by the facility's Process Control monitoring system to:

- Initiate External Alarms
- Activate Product Transfer Interlocks
- Update Time/Date Stamp Records
- Trigger Lightning Protection Bonding Inspection/Maintenance

Enclosure Ratings

- NEC/CEC: Class I, Groups B, C & D, Type 3 & 4, Class II, Groups E, F & G, and Class III Hazardous Locations
- ATEX: Zone 1

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Lightning Risks Involving Floating Roof Storage Tanks

- Studies have shown that **31% of all floating roof tank fires are caused by lightning related issues**.
- Rim Seal fires are the most common type of fire for floating-roof tanks, and it is estimated that **95% of rim seal fires are the result of lightning strikes**.

These fires can lead to months or years of downtime, tank/facility damage or injury to personnel.

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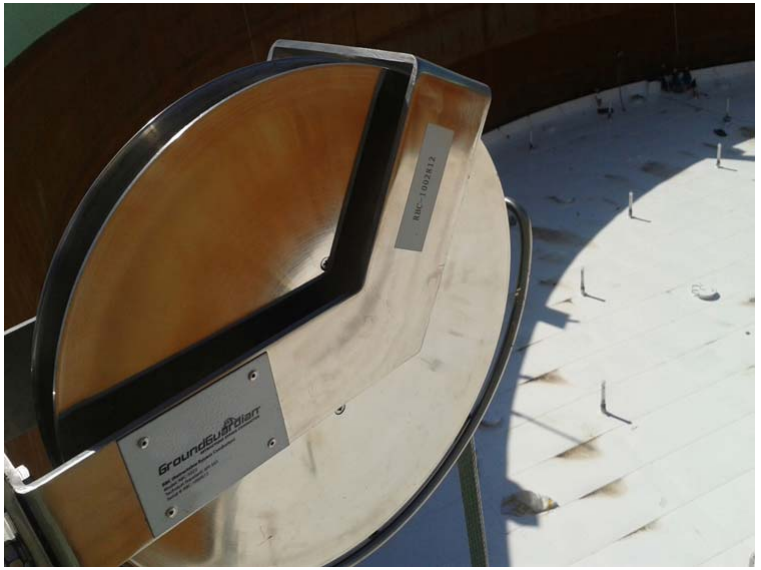
Potentially Hazardous Issues With Current Protection Methods

- Corrosion or by-product accumulations on the inside of the shell can create a high impedance/resistance connection between the shell and the shunts, resulting in sparking and possible ignition.
- **Shunts alone** are too unreliable to take this chance, as testing has shown that, rather than reducing the risk of fire from lightning strikes, they **may actually be increasing risk potential**.
- A poorly contacting rim-seal shunt on an EFRT is an example of where sparks might occur during lightning storms.

GroundGuardian® - Retractable Bypass Conductor (RBC)

The GroundGuardian® Retractable Bypass Conductor (RBC) provides an exceptionally low resistance and low impedance connection between the Floating Roof and Tank Shell Wall, ALLTEC's RBC prevents rim fires by dissipating lightning energy before it can arc and cause ignition.



ALLTEC®

Retractable Bypass Conductor - Features

- The 50mm^2 bypass conductor of the RBC is specially designed and manufactured with a low resistance copper core, safeguarded with stainless steel for exceptional corrosion resistance, strength and maximum durability.
- Comes with a safety stopping mechanism to maximize tank and personnel protection.

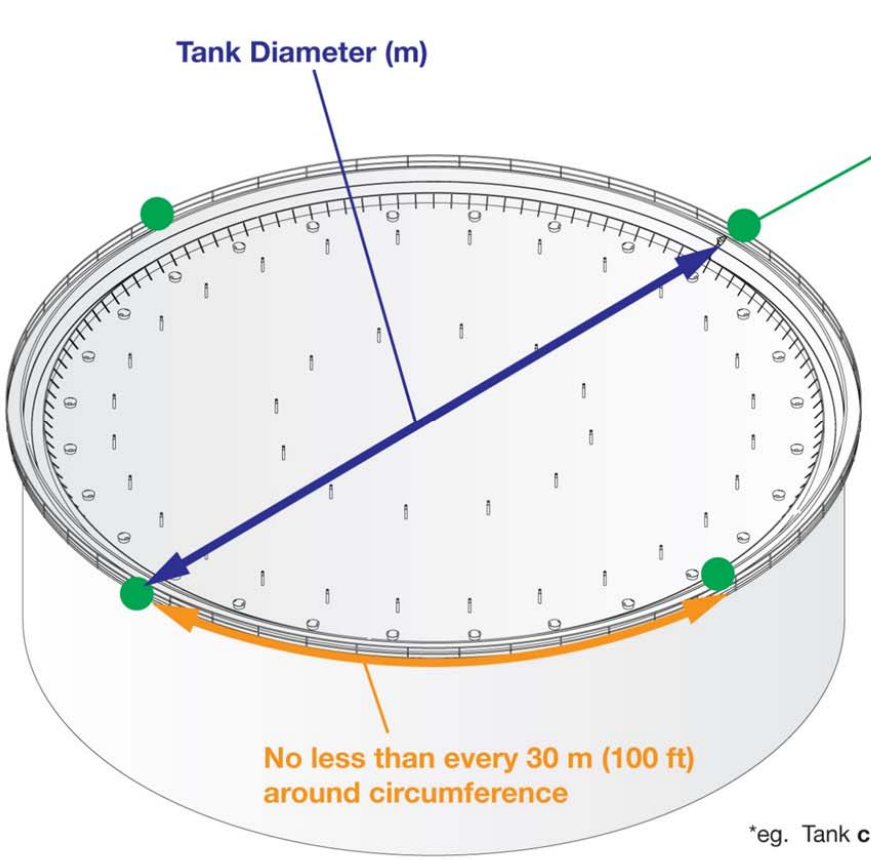
ALLTEC®

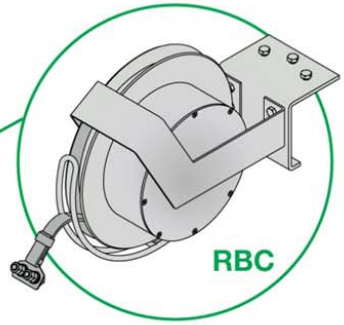
Retractable Bypass Conductor - Benefits

- Easily installed on new or existing facilities.
- Suitable for long life in any environment
  - Uses a sleek and exceptionally rugged construction made of heavy-duty 4-12 mm thick, stainless steel
- Comes with an industry leading two (2) year workmanship replacement warranty.

ALLTEC®

Retractable Bypass Conductor - How It Works





Multiple RBC's on each tank will provide low-resistance pathways to safely route lightning currents. A minimum of two (2) RBCs per tank needs spacing no less than every 30 m (100 ft), in accordance with API 545 4.2.1.2.2.

*eg. Tank **circumference** ≤ 120 m requires 4 RBCs.

RBC Quantity Selection Chart

Tank Diameter (m)	≤ 19.10	≤ 28.65	≤ 38.20	≤ 47.75	≤ 57.30	≤ 66.84	≤ 76.39	≤ 85.94	≤ 95.49	≤ 105.04	≤ 114.59	≤ 124.14	≤ 133.69	≤ 143.24
Quantity of Required RBCs	2	3	4	5	6	7	8	9	10	11	12	13	14	15

ALLTEC®

Surge Suppression

Tier Two

ALLTEC®

Transient Electrical Voltage

- Approximately 80% of transient activity at a given facility is internally generated.
- Transient activity can weaken equipment over time and eventually lead to catastrophic equipment failure.
- Properly installed surge protection devices on all circuit conductors maximizes total site protection from the threat that transient surges present.

DynaShield®

Surge Protection Device (SPD)s

- Main and Sub Panel Protectors (AC & DC)
- Medium Voltage Protectors
- Telephone Line Protectors
- Data Line and Low Voltage Protectors
- RF and Coaxial Protectors

DynaShield® - Surge Protection Device (SPD)s

DynaShield ® Surge Protective Device (SPD)s dissipate large amounts of surge energy and help prolong the service life of modern equipment.

ALLTEC®

DynaShield® - Features & Benefits

- Neutral/Ground Monitoring Circuitry and internal circuitry problem indicator
- Fast response and recovery
- Tight clamping levels
- Frequency Reactive Filtering
- Surge Counter, Audible Alarms and Dry Relay Contacts (certain models)
- An array of NEMA 4 & 4X rated enclosures
- Full Mode Suppression
  - Dedicated “Common Mode” suppression circuits to suppress lightning induced activity
  - Dedicated “Normal Mode” suppression circuits to suppress non-lightning generated transient activity

ALLTEC®

DynaShield® - Features & Benefits (Cont')

- Patented Rapid Response Thermal Disconnecting Mechanism Ensures Safe Operation
- UL1449-3rd Edition Approved for TYPE 1 and TYPE 2 Applications
- High 200kArms Short Circuit Current Rating (SCCR)
- Integrated Fault Indication Contact
- High Surge Current Capacity
- Dual Encapsulated Suppression Components Ensures (certain models):
  - Efficient, High Performance Operation
  - Wide Operational Temperature Ranges
  - Low Leakage Current Characteristics

ALLTEC®

DynaShield® - Surge Protection Device (SPD)s

COMPLIANCE

- Listed to ANSI/UL 1449-3rd Edition; UL 1283 (PT-Series)
- ANSI/IEEE C62.41.1- 2002 and C62.41.2- 2002 (PT-Series)
- Designed and tested to IEC 61643-1 (KSB Series and AD Series)
- KSB SPD product line is designed to adhere to IEC 61643-21 specifications, and provide protection from the highest LPZ, to equipment level application.

SURGE SOURCES

- Direct and Indirect lightning activity
- Grid switching & power factor correction actions
- Line Faults
- HVAC & furnace Igniters
- Fluorescent light ballasts
- Industrial equipment sequencing
- Elevator operation
- Inductive/Motor load power cycling
- Rectifiers
- And Many More

ALLTEC®

Lightning Protection

Tier Three

ALLTEC®

The Lightning - Fact and countermeasures

- In the United States alone, lightning detection systems monitor an average of 25 million flashes of lightning from cloud to ground every year, and lightning is reported to cause more than $2 billion damage annually.
- A properly installed lightning protection system (or LPS) is over 98% effective in preventing damage associated with a lightning strike.
- A well designed and correctly installed, low impedance and low resistance connection, between earth and the LPS components is essential.

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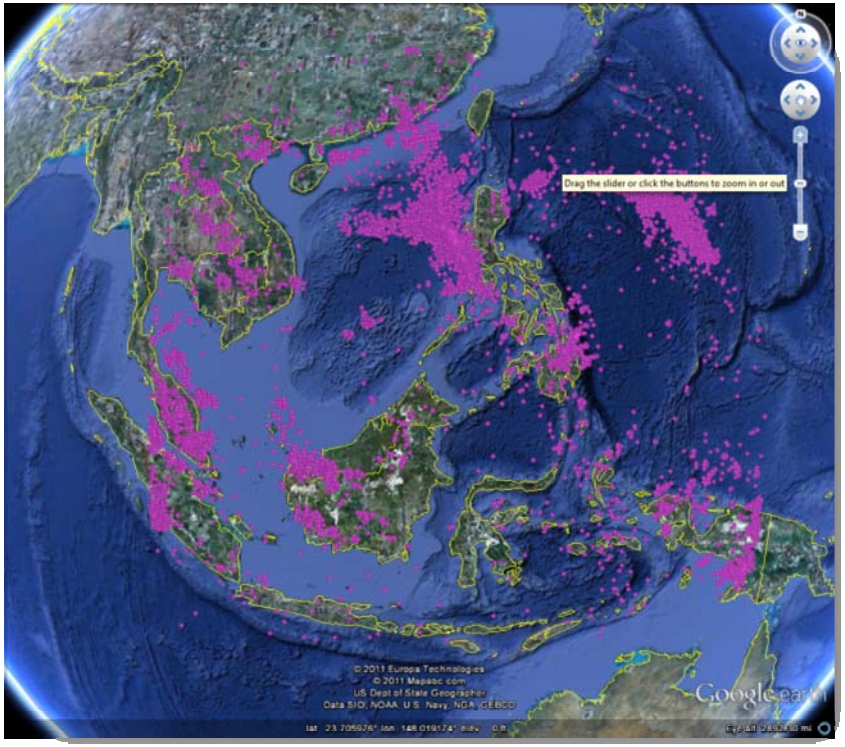
Regional Lightning Data

By Date, Region, Category

- Single day, -10 to 30 N, 100-140E, cloud-to-ground



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9/1/2011 0:00:22	489	17.5176143	117.5774002	-39800
9/1/2011 0:00:29	374	17.5544066	134.1304721	-46100
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9/1/2011 0:00:43	827	14.6278984	136.7921054	-61800
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ALLTEC®

ALLTEC's Lightning Protection Solutions

TerraStat®

Charge Dissipation Terminals (CDT)

TerraStreamer®

Early Streamer Emission Terminals (ESE)

ALLTEC®

Available Lightning Protection Components

- Lightning Strike Counters
- Conventional Air Terminals and Bases
- Lightning Protection Conductors
- Bonding Lugs, Clamps and Straps
- Connectors and Splices
- Adhesives, Fasteners, Anchors, and Hardware

TerraStat® - Charge Dissipation Terminals

Developed by ALLTEC, TerraStat® is the latest design in Charge Dissipation Technology.

TerraStat® - Features

- Provides enhanced performance over traditional lightning protection
- Patented Technology
- High-grade stainless steel construction
- Low wind loading
- UL listed and recommended as per API 2003
- Independently tested
- Meets or exceeds UL 96A, NFPA 780, and IEC 62305 standards

ALLTEC®

TerraStat® - Benefits

- Lightweight and easy to install
- Corrosion resistant
- Large selection of mounting hardware
- Is available in custom systems designed and manufactured by ALLTEC to fit your needs

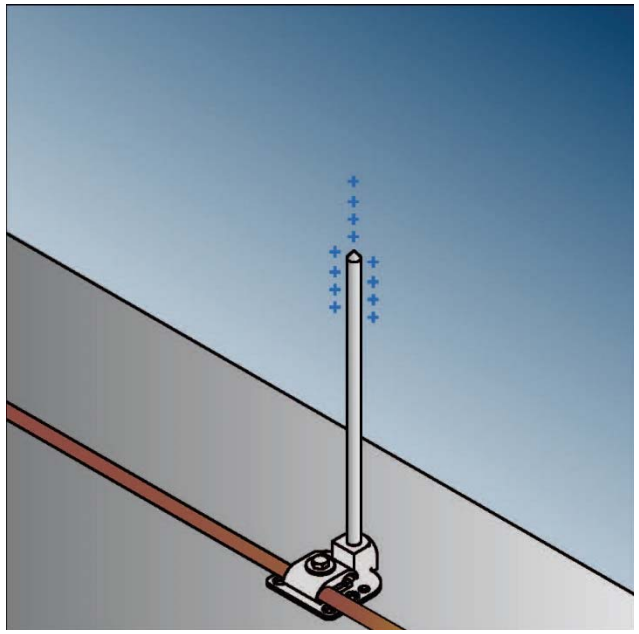
ALLTEC®

TerraStat® - Charge Dissipation Terminals

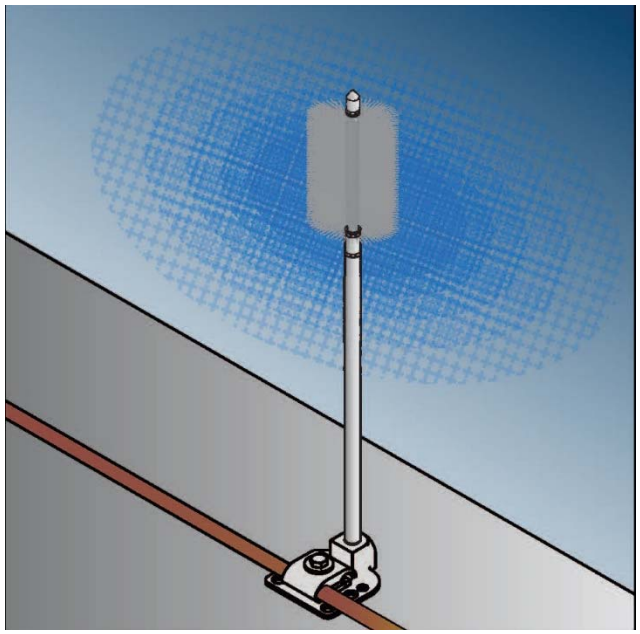
TYPICAL APPLICATIONS

- TS-100: Standard Protection. Office buildings, shelters, industrial facilities, homes, and warehouses
- TS-400: Enhanced Protection. Monopoles, petrochemical, high-mast lightning, communication towers and externally mounted cameras
- TS-500 (Vertically Mounted) and TS-510 (Horizontally Mounted): Enhanced Protection. Communication towers, bridges, petrochemical storage facilities, and stacks

How It Works - Charge Accumulation vs. Charge Dissipation



Traditional Lightning Rod



Charge Dissipation Terminal

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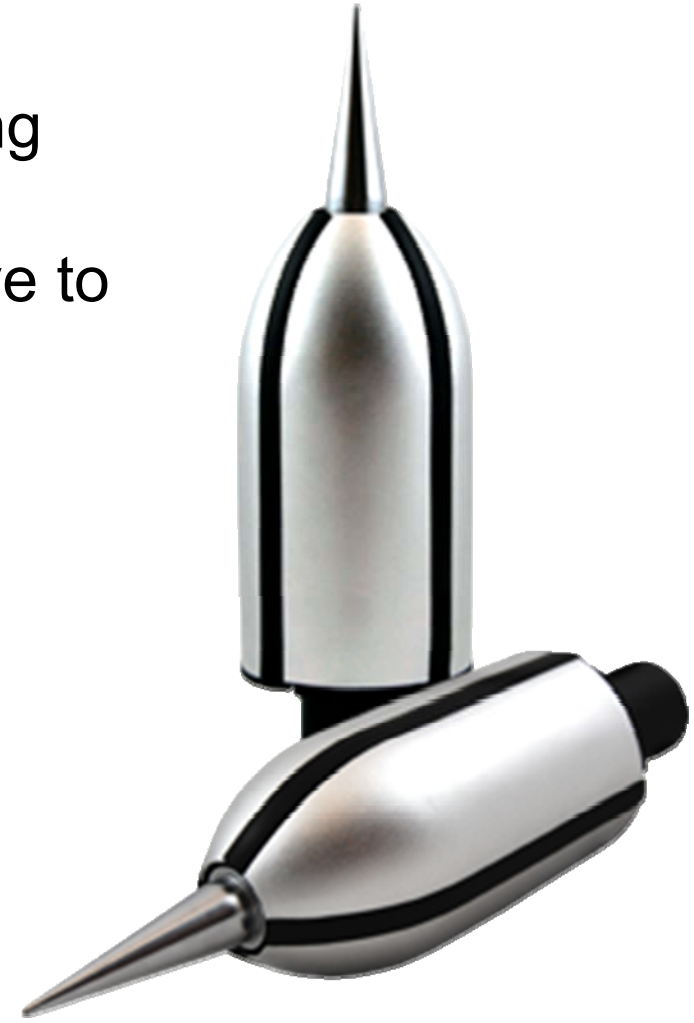
TerraStreamer® - Early Streamer Emission Terminal (ESE)

By utilizing the advanced technology, TerraStreamer® ESEs provide lightning protection to facilities that would otherwise be difficult or cost prohibitive to protect by conventional means.



ALLTEC®

TerraStreamer® - Features & Benefits

- Patented Technology
- NF C 17 – 102 and UNE 21 186 tested and certified
- Lightweight and low wind loading
- Reliable performance in all weather conditions
- Suitable for corrosive environments
- Available in five models for numerous applications
- Economical and easy to install
- No internal electronics or power supply

ALLTEC®

TerraStreamer® - Early Streamer Emission Terminal (ESE)

TYPICAL APPLICATIONS

- Distribution Warehouses
- Industrial Plants
- Apartment Buildings
- Shopping Malls
- Shipping Terminals
- Other Large Area Structures

ALLTEC®

The ESE Principle

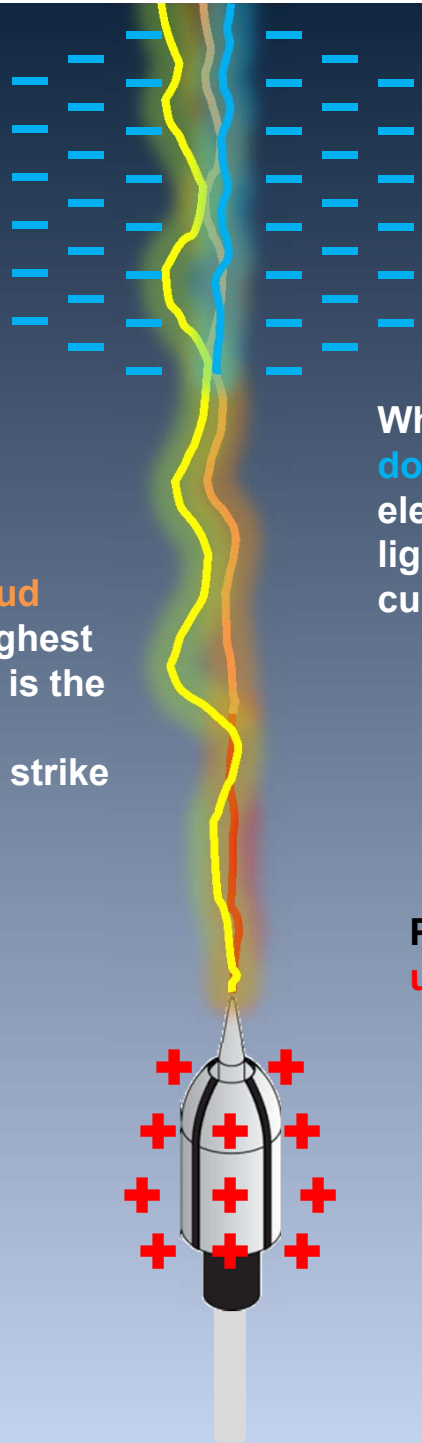
1. Thunderstorm begins creating downward step leaders
2. Ambient electric field intensity in the area of the ESE terminal increases
3. Terminal is triggered to release the stored ground charge
4. Upward streamer is formed microseconds earlier than other objects in the immediate area
5. The TerraStreamer® ESE terminal becomes the target of the developing lightning strike

ALLTEC®

How TerraStreamer® Technology Works

When a thunderstorm begins to generate downward step leaders, the ambient electric field intensity around a grounded lightning protection system induces current towards the ground .

When a step leader from a storm cloud begins approaching the earth, the highest potential and most likely strike point is the upward-moving streamer, thereby attracting and controlling a lightning strike to the TerraStreamer® ESE terminal.



Positive charge is released to form an upward streamer.

The TSP terminal collects ground charges during an initial phase of thunderstorm development.

Advantages

- Externally mounted, proactive, structural lightning protection devices
- Designed to activate in the moments directly preceding an imminent, direct strike
- Tested to certify gain in triggering time (ΔT) as per NF C 17-102 and UNE 21 186
- Designed to ensure that the system provides a secure zone of protection

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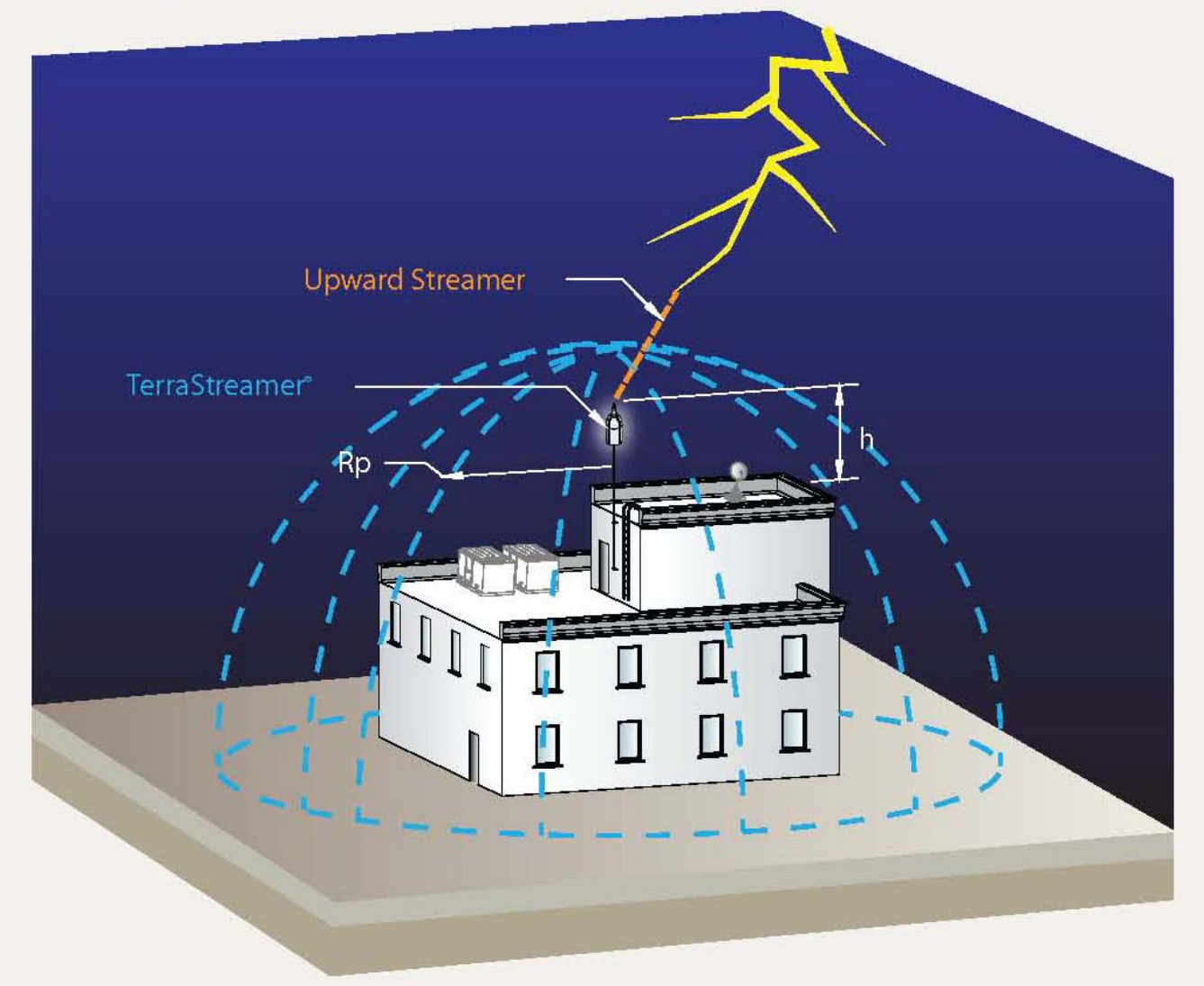
Protection Radius



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Mitigate Risk with Customized Products & Solutions

- Assessing the Problems, Providing Answers, Project Oversight & Continued Protection
- Development & Manufacture of Technologically Advanced Products
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THANK YOU!

Questions?

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