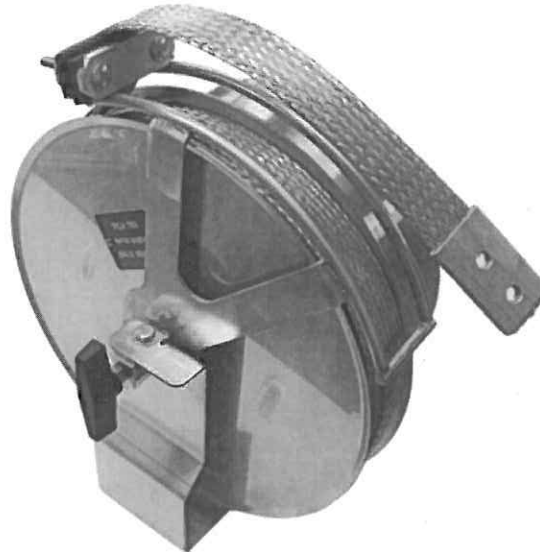


Installation Instructions

Retractable Grounding Assembly (RGA) 750

Rev A, January 2015



Manufactured for Lightning Eliminators & Consultants, Inc.
by Conductix, Inc. 10102 F St Omaha, NE 68127.

Introduction

The RGA 750 is designed to create the lowest impedance connection between the roof and shell of a floating roof tank by creating the shortest possible path between the two. This connection is obtained by keeping constant tension on the wide aluminum braided cable.

The following manual outlines the procedures required for proper installation of an RGA. If a custom installation or installation on a closed roof tank is desired, please contact your LEC Sales Manager or Technical Support.

In many cases, the RGA is sold in conjunction with LEC's Dissipation Array System (DAS). An LEC site supervisor is an important and critical part of the DAS installation. The Supervisor will assist the on-site contractor that will be responsible for installing the DAS. This assistance includes training the contractor in the nuances of the installation and thereby ensuring proper installation. Further, the Supervisor will be available to address any questions that may occur during installation.

Note: Review all documents and drawings prior to commencing work. The RGA can be installed on a tank during maintenance shut downs or while the tank is in service. Follow all plant safety procedures and acquire necessary permits.

Equipment and Tools Required

Pneumatic Punch, Hand Punch or Drill to create 7/16” [11mm] diameter holes
 9/16” or Adjustable Wrench x 2

Wire Wheel or Brush

Lectra Shield

Note: Tap set or welder may be required if tank has bolted foam dam

Supplied Parts

Part Name	Quantity
Reel, 316L Stainless Steel	1
RGA Mount, 316L Stainless Steel	1
3/8” 316 Stainless Steel Bolt	2
3/8” 316 Stainless Steel Flat Washer	2
1,056/30 Braided Aluminum Cable	80ft [24.4m]
Cable Stop	1
Handle	2
Horizontal Bracket, Galvanized Steel	1
12” Flexible Aluminum Ground Strap	2
3/8” 316 Stainless Steel Bolt	10
3/8” 316 Stainless Steel Nut	10
3/8” 316 Stainless Steel Flat Washer	20
3/8” 316 Stainless Steel Lock Washer	10
Installation Manual	1

Preparing Materials

Inspect reel, cable, hardware, grounding straps, mount and wire guide. Do not remove the shrink-wrap from the cable on the reel at this time. Contact your LEC representative or LEC Sales Manager and **DO NOT INSTALL** the RGA if any of the parts are missing or damaged.

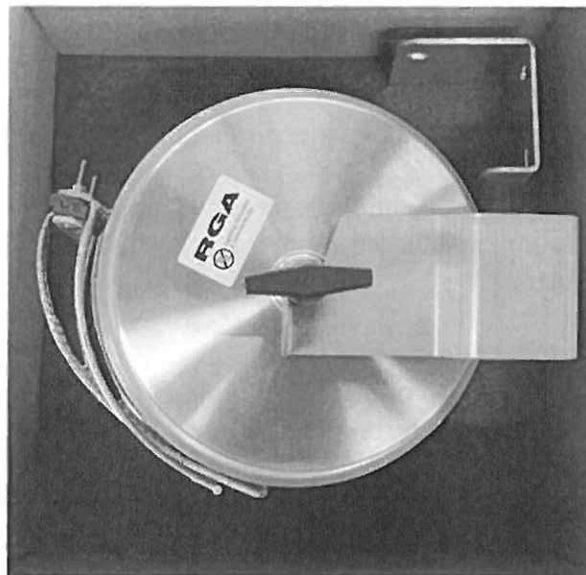


Figure 1: Boxed RGA from LEC

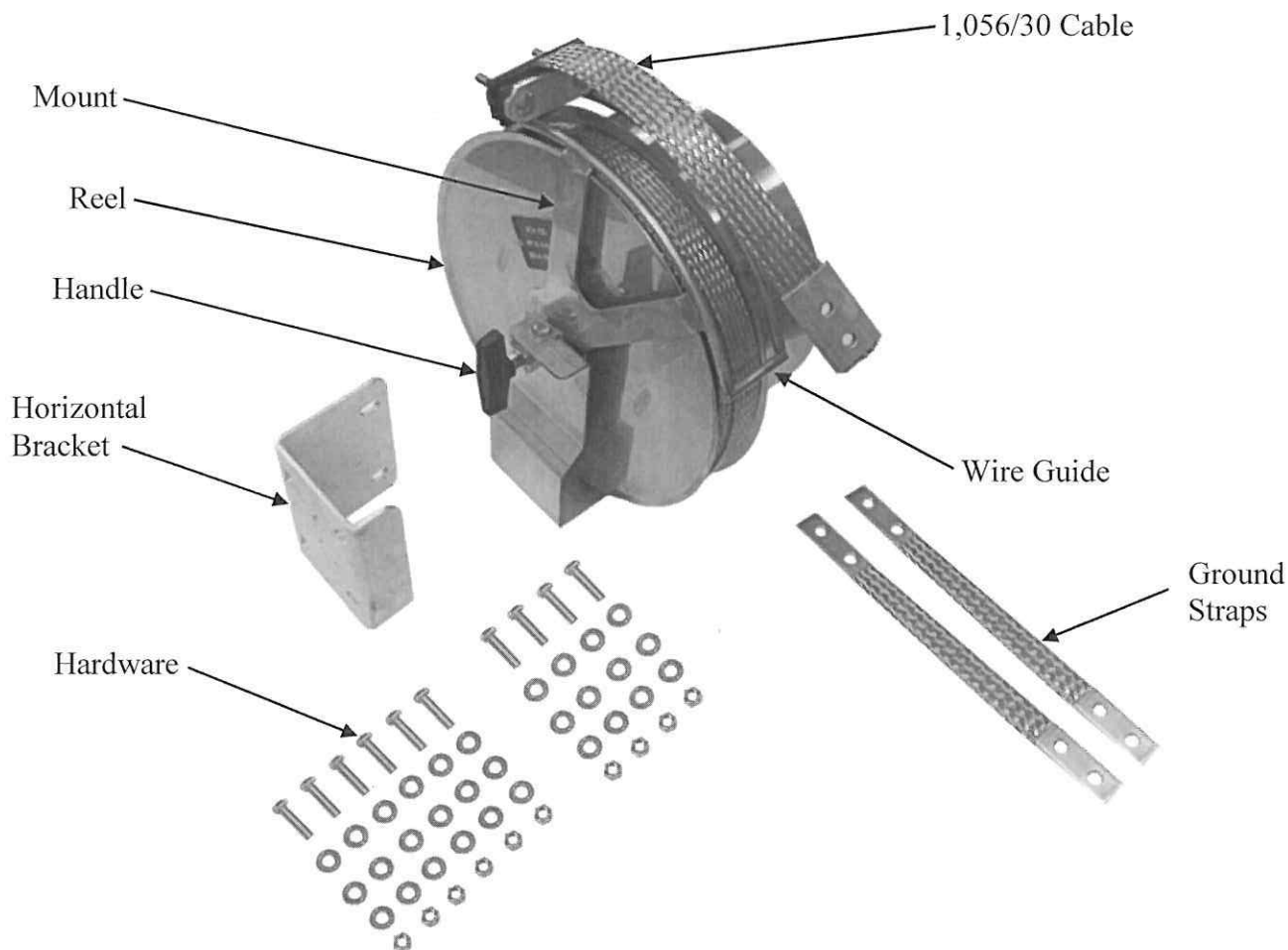


Figure 2: RGA Assembly

Layout and Tank Preparation

If an installation drawing with the RGA quantity and location is provided by LEC, mark the location(s) of where the RGA should be placed in accordance with the print. If a drawing is not provided, the RGAs should be equally spaced from each other according to API Recommended Practice 545, Recommended Practice for Lightning Protection of Aboveground Storage Tanks for Flammable or Combustible Liquids, latest edition, which requires that bypass conductors be evenly spaced not more than every 100 ft. [30m] around the circumference of the tank with a minimum of two. For example, 4 RGAs (bypass conductors) would be required for one 100 ft. [30m] diameter tank. Each RGA would be placed 90° apart or roughly 78ft – 6 ½ in. [23.94m] on the circumference of the rim of the tank. Mark these locations. Ideally, the RGA will be placed on the highest possible location of the tank: the fire suppression/swash plate, because explosive gases must not be present immediately around the reel during regular use. If the RGA cannot be mounted on the fire suppression plate or directly to the tank wall, use the Horizontal Bracket.

Note: Ensure that the RGA will not interfere with the tank roof when fully filled. Finally, if any obstacles or interferences are encountered, contact the LEC Sales Manager for assistance.

Attaching the RGA to the Tank

The RGA can be mounted directly to the fire suppression plate/tank wall or to the tank lip using the supplied Horizontal Bracket. The drawing "RGA Mount", located at the end of this document, illustrates the two mounting methods. This can be used as an aide to assist in determining which mounting option is best suited for your application: directly to the vertical tank wall or utilizing the supplied Horizontal Bracket to mount to the rim of the tank.

Mounting the RGA directly to the Tank Wall – Create four (4) 7/16 in. [11mm] diameter holes in the tank wall according to Figure 3 below, RGA Mount – Hole Dimensions. Scrape paint and rust from around the drilled holes and under the RGA Mount to bare metal. Apply Lectra Shield to both sides of the holes and all bare metal surfaces to prevent rusting. Using the supplied hardware, secure the RGA Mount and Reel assembly to the tank wall and apply Lectra Shield to the hardware after assembly. Alternately, the RGA Reel may first be separated from the Mount by removing the 3/8" bolts on either side of the Reel and the Mount may be attached to the tank wall separately from the Reel; see Figure 4, Mounting the RGA Mount to the Tank Wall.

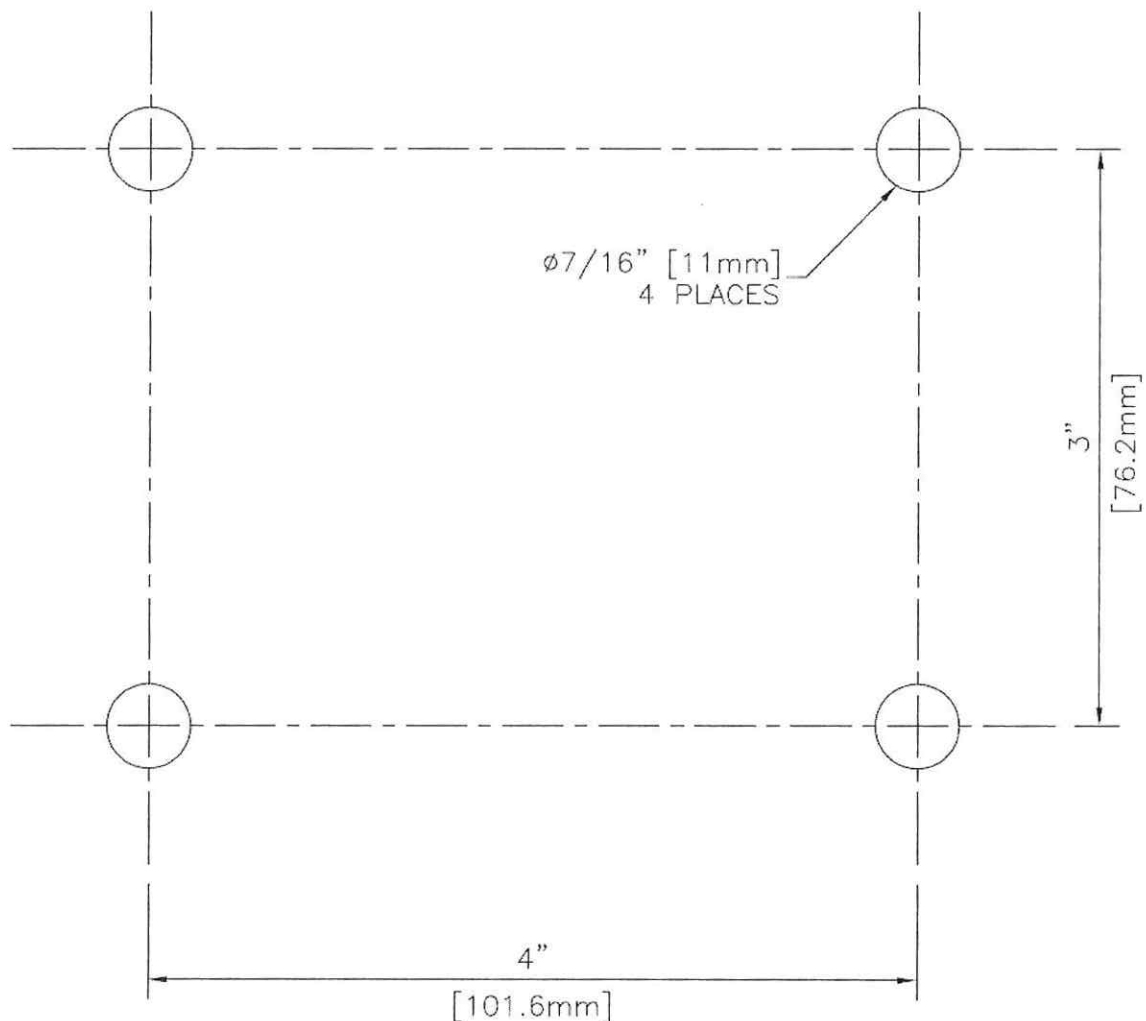


Figure 3: RGA Mount – Hole Dimensions

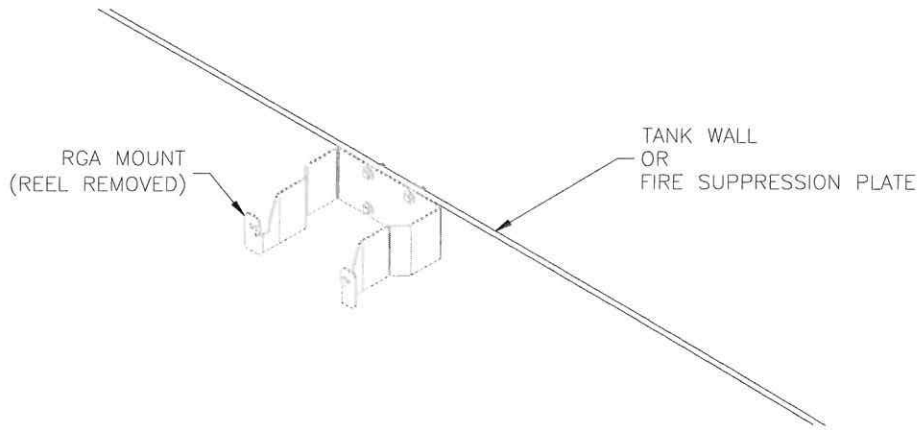


Figure 4: Mounting the RGA Mount to the Tank Wall

Mounting the RGA using the Horizontal Bracket – Two (2) 7/16” [11mm] diameter holes need to be made in the field on the tank lip using the Horizontal Bracket as a template. See Figure 5, Horizontal Bracket - Hole Dimensions. Scrape paint and rust from around the drilled holes and under the Horizontal Bracket to bare metal. Apply Lectra Shield to both sides of the hole and all bare metal to prevent rusting. Using the supplied hardware, secure the Horizontal Bracket to the tank rim angle and apply Lectra Shield to the hardware after assembly. Attach the RGA Mount and Reel assembly to the Horizontal Bracket. See Figure 6, Mounting the Horizontal Bracket to the Tank Rim Angle.

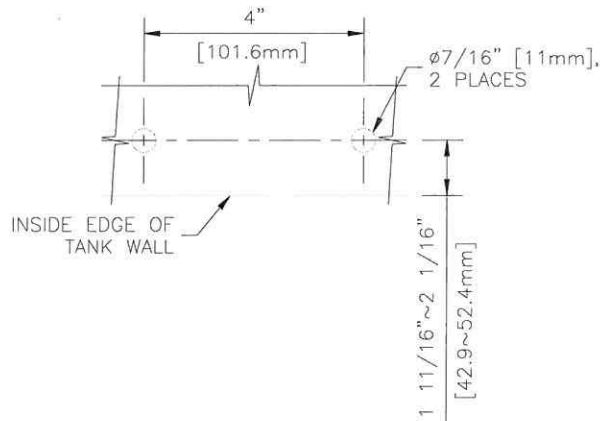


Figure 5: Horizontal Bracket – Hole Dimensions

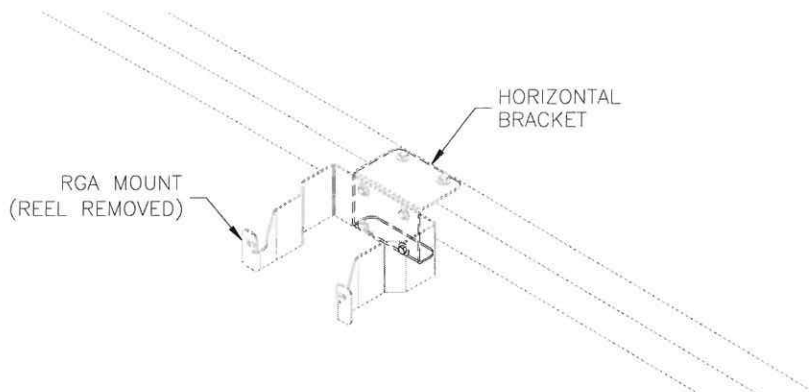


Figure 6: Attaching the Horizontal Bracket to Tank Rim Angle

Grounding and bonding

Foam Dam Types – Two methods are commonly used to attach foam dams to floating roofs, as illustrated below. The sketch on the left shows a typical foam dam which is welded directly to the floating roof. It generally consists of an approximately ¼ in. [6.4mm] thick piece of steel, approximately 18 – 24 in. [457 – 610mm] tall, that is rolled to the approximate diameter of the tank and welded directly to the floating roof. The sketch on the right shows a typical bolted foam dam connection which generally consists of a series of 18 – 24 in. [457 – 610mm] wide plates which are bolted to a welded portion of the floating roof. These foam dam plates are typically mounted over the primary and secondary seal fabric, as well as any gasket material, thereby resulting in unacceptably high impedance between the foam dam and floating roof.

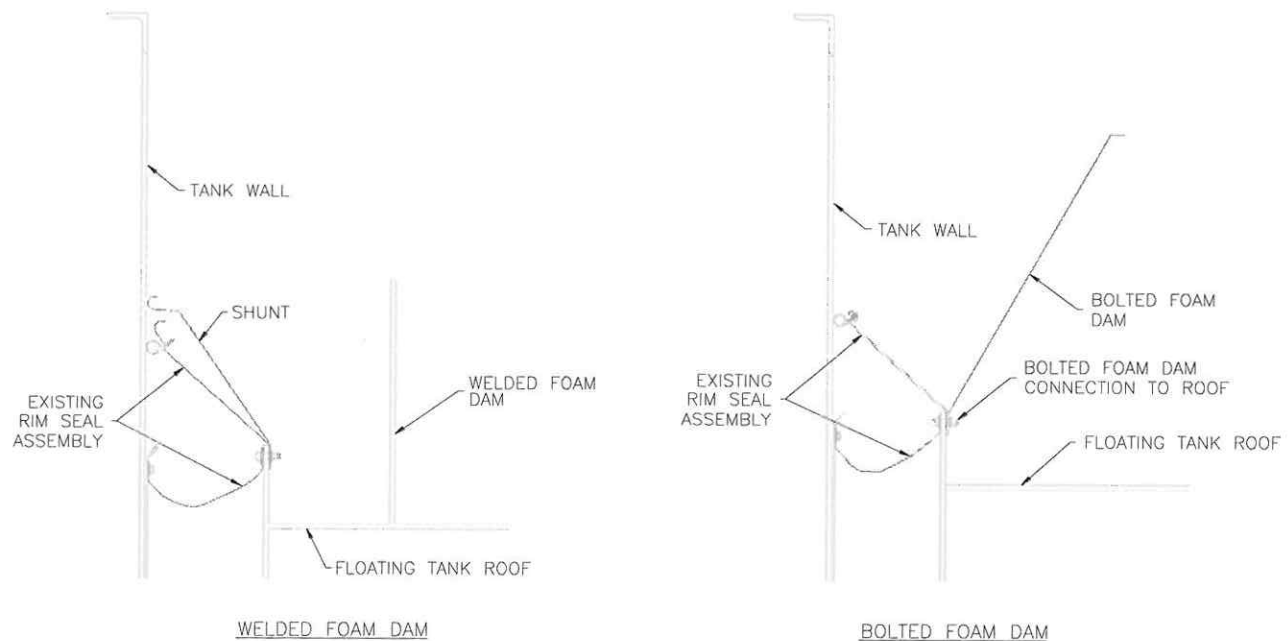


Figure 7: Foam Dam Types

RGA straps MAY NOT be attached to a bolted foam dam as seal fabric and gasket material prevent the establishment of an acceptable electrical connection between the straps and tank roof. If the tank has a bolted foam dam, additional mounting hardware will be required and the bolted foam dam strap installation procedure below must be followed.

Regardless of foam dam type, the attachment point on the floating roof **must align vertically** with the center of the braided cable wire, as shown in Figure 8. To facilitate vertical alignment, the RGA should be installed when the tank is at its fullest capacity. A ‘plumb bob’ or laser level can be used for best possible results (caution – a ‘plumb bob’ should only be utilized when the wind is calm). Maintaining vertical cable alignment within +/- 12 in. [305mm] will minimize cable wear and maximize cable life.

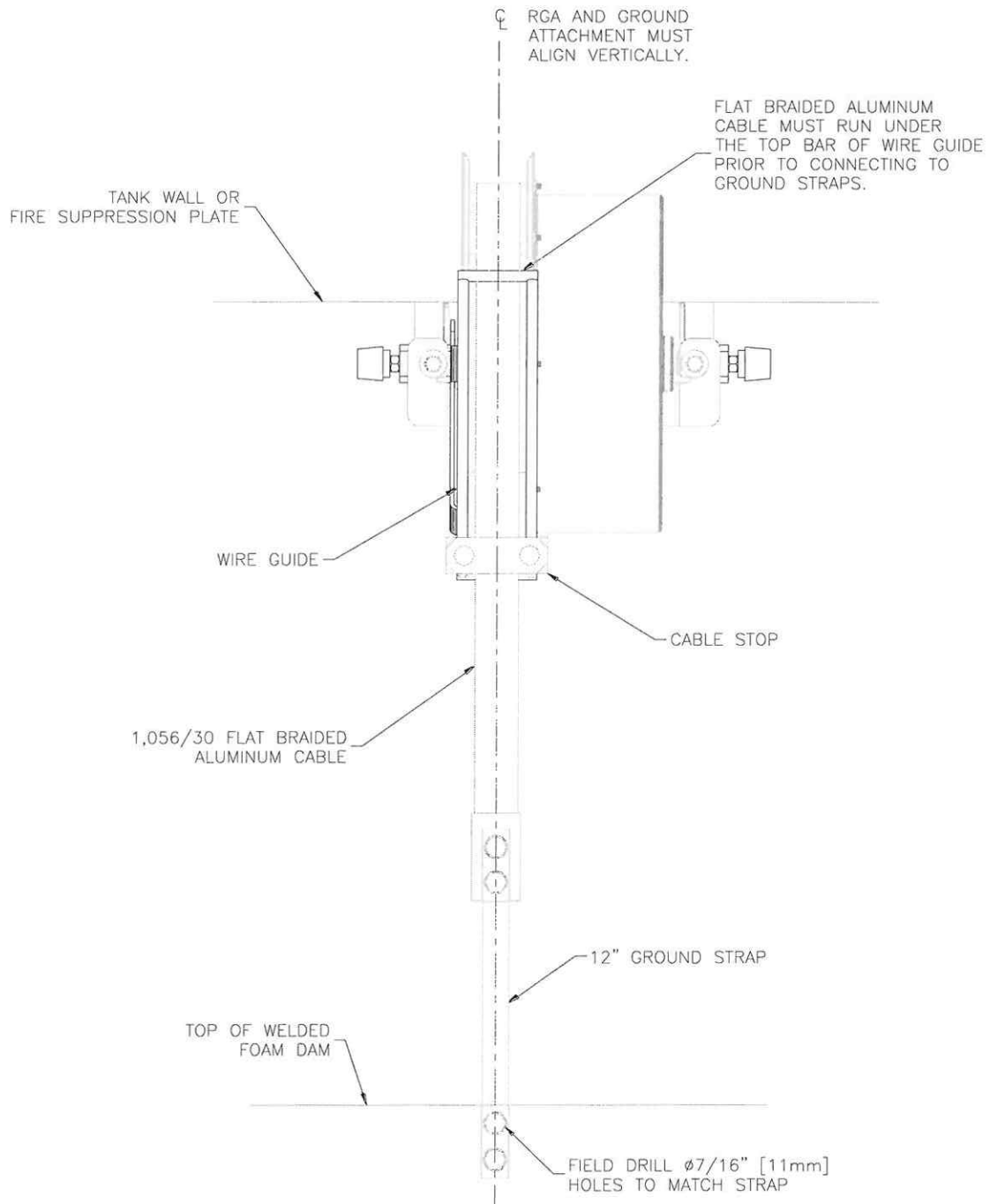


Figure 8: RGA Front View, Welded Foam Dam Shown

Welded foam dam strap installation – If the foam dam is welded to the roof, as shown in Figure 9, then the instructions below should be followed in order to attach the RGA straps to the foam dam.

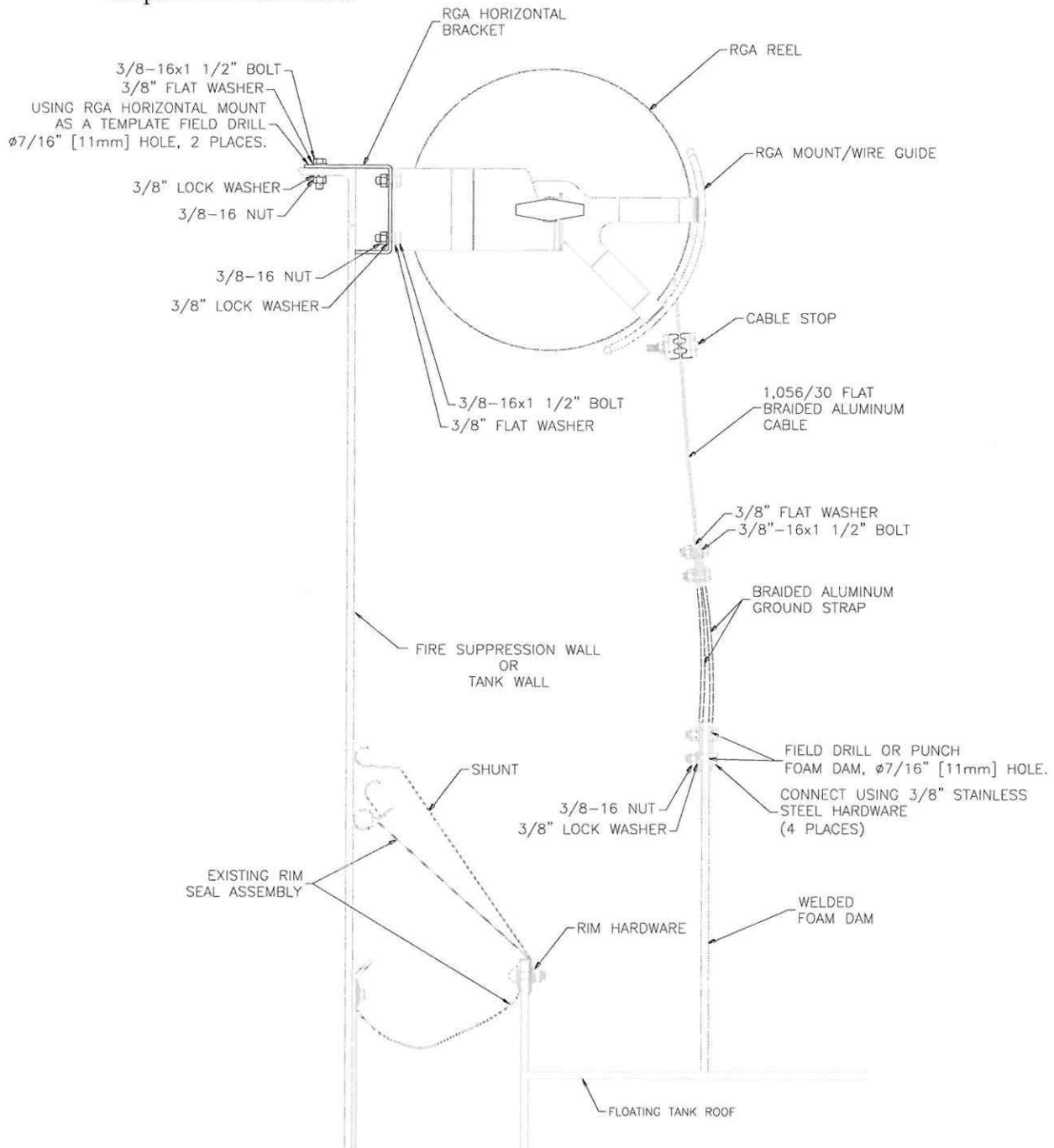


Figure 9: Welded Foam Dam RGA Installation

Locate an attachment point to the welded foam dam that is vertically aligned with the RGA, then create two (2) 7/16 in. [11mm] diameter holes using the Ground Strap as a template, see Figure 11. Scrape paint and rust from around the drilled holes and under the ground strap mounting surfaces to bare metal. Apply Lectra Shield to both sides of the holes and all bare metal to prevent rusting.

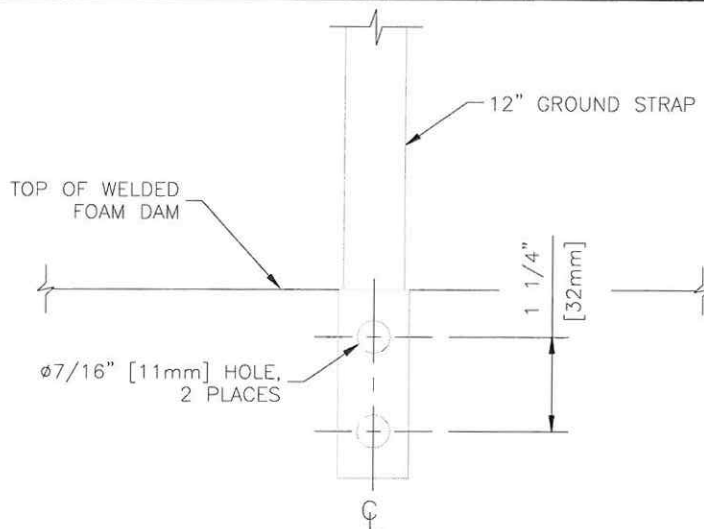


Figure 10: 12" Flexible Ground Strap End

Bolted foam dam strap installation – If the foam dam is bolted to the roof, as shown in Figure 11, then the instructions below should be followed in order to attach the RGA straps to the tank roof.

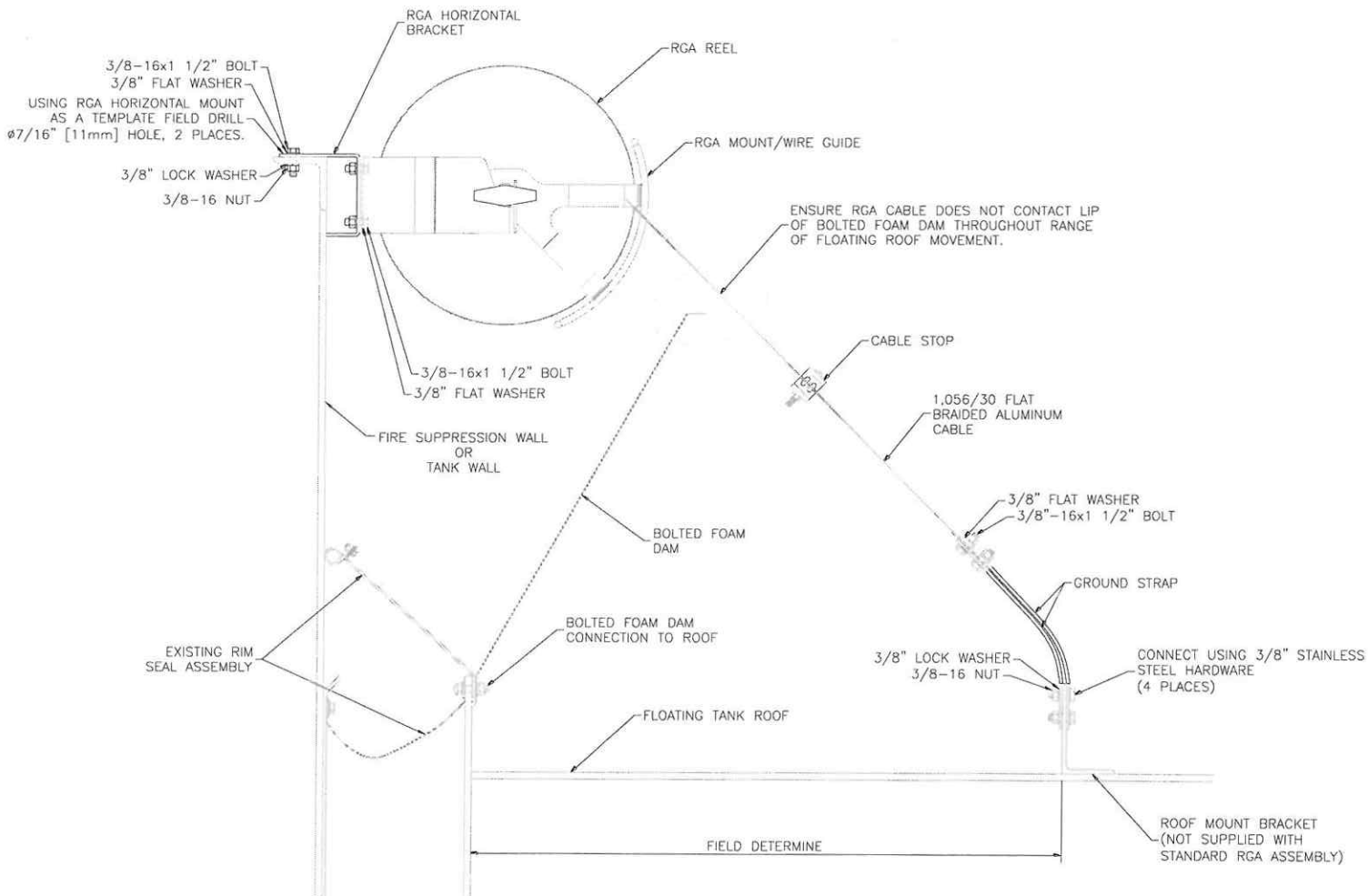


Figure 11: Bolted Foam Dam RGA Installation

Locate a level portion of roof that is vertically aligned with the RGA and sufficiently inboard from the tank wall so that the RGA cable and straps will not rub against any portion of the bolted foam dam as the tank roof rises and falls, as shown in Figure 11. The RGA cable and straps will be nearest to the lip of the foam dam when the tank is at its fullest and the roof is near the top of the tank.

Scrape paint and rust on the roof to bare metal where the custom roof mount bracket (not included in standard RGA installation kit – bracket must be ordered separately) will be placed. Weld the bracket all the way around to the tank roof. If welding is not possible, the bracket may be temporarily attached to the roof by drilling and tapping two (2) 3/8 in. holes, using the bracket as a template. If the bracket is bolted to the roof, it should be welded in place during the next maintenance shutdown or when feasible to do so.

Apply Lectra Shield to the welded or bolted connection to prevent rusting.

Placing the RGA into service

When the tank is ready to be placed into service, follow the steps below to finalize the installation:

1. Turn the RGA reel back and forth to verify that the reel rotates freely and does not bind.
2. Un-reel the RGA cable to the roof of the tank.
3. Pull the cable out the intended travel distance and carefully allow it to rewind. This procedure should be repeated five (5) to ten (10) times in order to prepare the springs for use.
4. Secure the supplied Ground Straps to the tank and RGA cable, one on each side of the foam dam or custom bracket and RGA Cable, with the supplied stainless steel hardware (see Figure 12).
5. Confirm cable retraction by pulling the cable out and letting it retract back.
6. Verify that all nuts and bolts are mechanically tight with clean electrical contact.

Note: Do not remove or adjust the position of the cable stop which is factory set 12" [305mm] from the end of the cable to prevent loss of pre-tension turns.

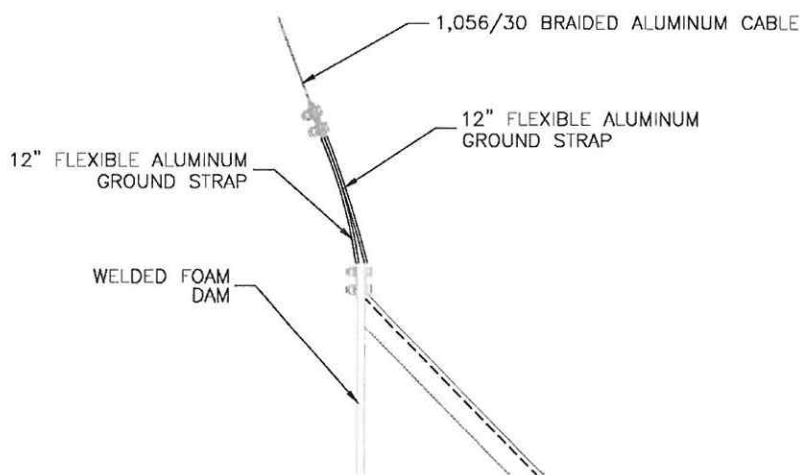


Figure 12: Ground Straps on Either Side of Welded Foam Dam

Finally, coat all mechanical ground connections with Lectra Shield. If you encounter any problems, contact the LEC Site Supervisor immediately or the LEC Sales Representative in the absence of a Site Supervisor.

To maximize cable and strap service life, LEC recommends disconnecting the ground straps from the foam dam or custom bracket and allowing the cable to retract if the tank will be out of service for an extended period of time. The RGA Ground Straps should be reconnected before the tank is placed back into service. When reconnecting the Ground Straps remove any rust at the connection point to bare metal and apply Lectra Shield before and after securing the straps.

Welding the Horizontal Bracket

The Horizontal Bracket should be welded onto the tank lip during a maintenance shut down or when feasible to do so.

Corrosion Protection

For the RGA to function properly LEC requires a coating of Lectra Shield, a corrosion inhibitor, to be applied to all mechanical grounding connections as described above. Lectra Shield can be purchased directly from LEC.

- Lectra Shield LEC Part #0000120
 - LEC Approved Alternatives (if Lectra Shield is unavailable):
 - Emerson & Cummings: ECCOCOAT CC 40 A
 - Sanchem Inc.: NO-OC-IC Special

Uninstall

In the event that the RGA must be removed from the tank, the following steps should be followed. The tank should be at its fullest capacity to minimize stored energy in the springs. Unbolt the ground strap from the foam dam or custom bracket without allowing the spring motor to recoil. Next, carefully retract the strap to the reel. Secure the strap to the reel with shrink-wrap or heavy-duty tape. While supporting the Reel, either unbolt and separate the Reel from the Mount, or unbolt and separate the Reel and Mount assembly from the tank. The RGA horizontal bracket, if present, may then be unbolted from the tank.

Maintenance

RGAs are often installed in corrosive environments. The more corrosive the environment, the more frequently inspection and maintenance must be performed. At a minimum, the following should be performed on an annual basis. LEC recommends an increase in the frequency of inspection/maintenance as conditions require.

- Remove build-up from RGA cable and reel.
- Keep the bearing well lubricated using Thomas & Betts Aluma-Shield PN M-53 or AP8, Sanchem Inc. NO-OX-ID “A-Special” or other electrically conductive lubricant.
- Visually inspect the Ground Straps for dirt, corrosion or tearing; if there is a tear in the strap, replace immediately.
- Visually inspect the RGA cable for dirt, corrosion or tearing; if there is a tear in the cable, call your LEC Sales Manager immediately.
- Ensure that all Ground Strap, Mount, and Horizontal Bracket nuts and bolts are mechanically tight. Tighten any loose hardware immediately.

Replacement Parts

- 12” Flexible Aluminum Ground Strap LEC Part #0010874
- 12” Flexible Aluminum Ground Straps (x2) and 3/8” SS Hardware LEC Part #0010861
- 80ft 1,056/30 Braided Aluminum Cable LEC Part #0010863

ATEX Certification

The CE/Ex markings on the RGA signify the RGA’s compliance with the requirements of Directive 94/9/EC involving potentially explosive atmospheres. The various markings are described below.



- CE** CE Mark
- Ex** Specific mark for explosion protection
- II** Equipment Group II: intended for use above ground, not for use in mines
- 2** Equipment Category 2: the equipment is protected against ignition hazards in normal operation where a gas is likely to occur under normal conditions
- G** Equipment is intended for exposure to explosive gasses and mists only (not protected against explosive dusts)
- T4** In normal operation, the maximum surface temperature of the equipment will not exceed 275 deg. F (135 deg. C).

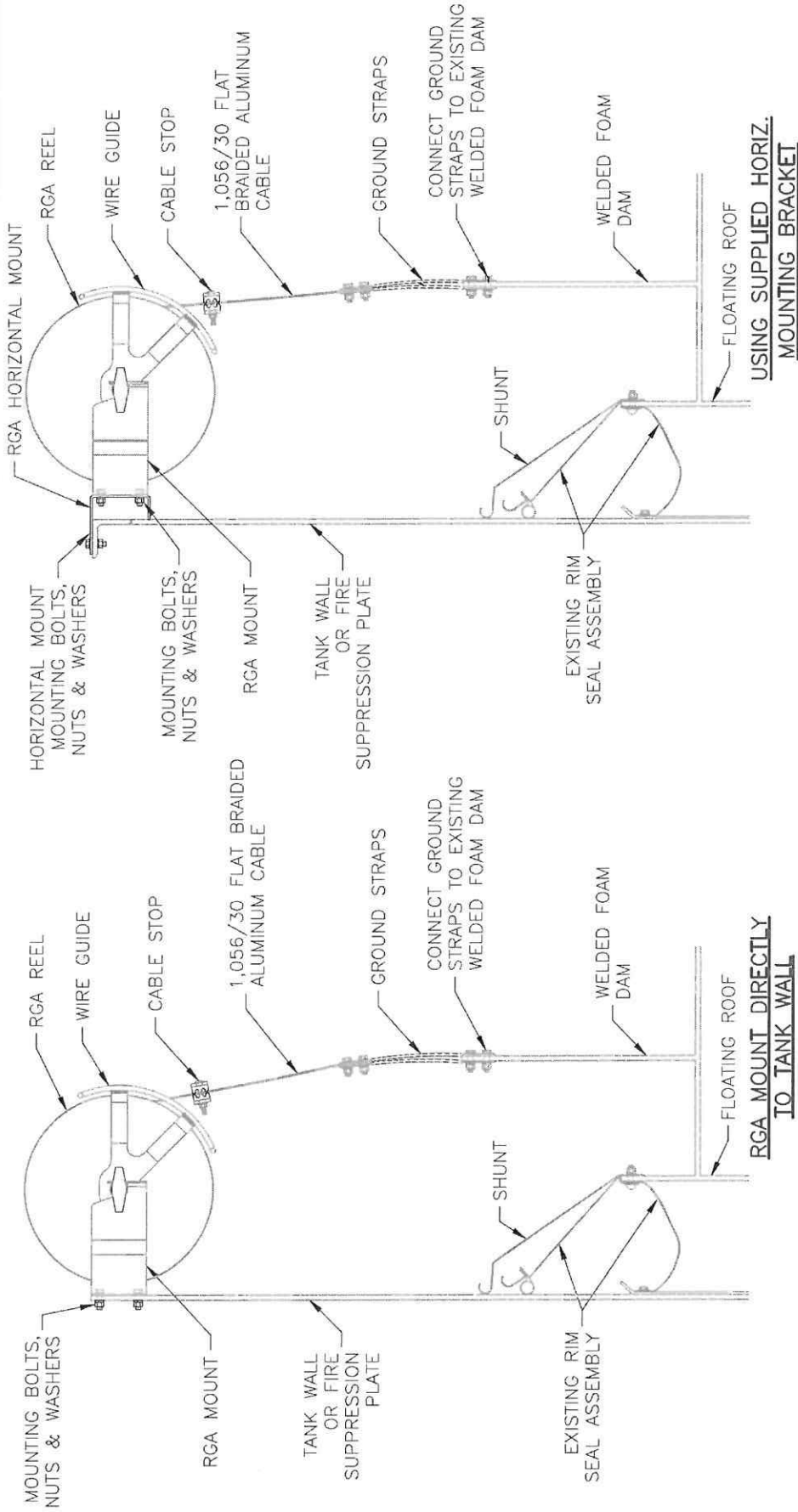
Technical Support

For technical support please contact:

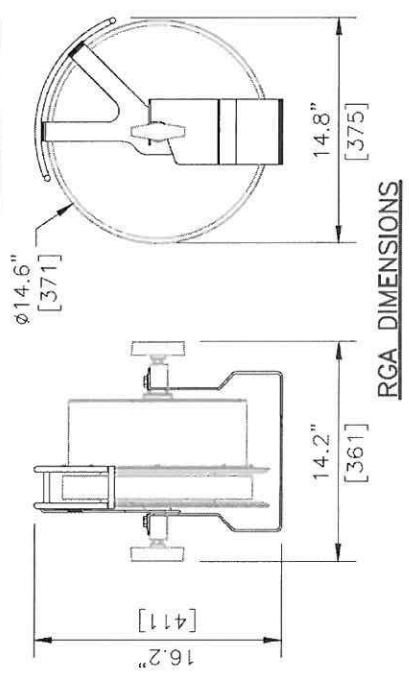
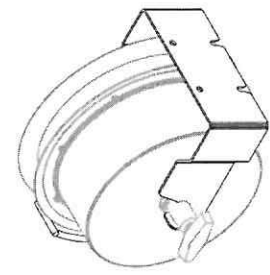
Lightning Eliminators & Consultants, Inc.
6687 Arapahoe Road
Boulder, Colorado 80303 USA
PHONE: (+1)303/447-2828
FAX: (+1)303/447-8122

10:07 JAN 9, 2015

RGA_MOUNT.A12



WEIGHT
REEL & MOUNT: 78 LB. [36 KG.]



Lightning Eliminators & Consultants, Inc.
6687 Arapahoe Road
Boulder, Colorado 80303
Phone 303 447-2828

RGA MOUNTING OPTIONS

DRAWING NO. **RGA MOUNT**