



## ACCESS CONTROL VEHICLE DETECTION SOLUTIONS

**FROM  
EBERLE DESIGN (EDI) &  
RENO A&E (RAE)**

Rev. C 14Dec16 WHS - CGZ  
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## EDI & RAE

### MORE THAN 37 YEARS OF TRUSTED ACCESS, PARKING, TRAFFIC & RAILWAY CONTROL PRODUCTS

- US-based designer manufacturer of reliable mission-critical vehicle detection and safety monitoring products to enhance and augment parking, access, traffic and railway control systems.
- Products include vehicle detectors, intersection safety monitors (MMU/CMU), power supplies, flashers, load switches and other vital infrastructure devices for access & transportation professionals to integrate, automate, measure and better manage parking, access and highways/signalized intersections.
- Global market leader in design and manufacture of inductive loop vehicle detectors (per IHS Research, Dec 2014)
- Provides more than 850 different products for vehicle detection, parking/access control, safety monitoring of intersections and railways, Automatic Vehicle Identification (AVI) and prefabricated loops for roadways and railway detection

ISO 9001:2008 registered Engineering and Manufacturing facilities in Phoenix, Arizona and Reno, Nevada USA





## THE EDI & RAE VALUE PROPOSITION

# >37 YEARS OF SUCCESS

1. JUST-IN-TIME SUPPLY
2. HIGH RELIABILITY
3. EXTREME SERVICE
4. FAIR PRICING
5. PROVIDE CUSTOMIZED SOLUTIONS TO OUR PARTNERS

### Inductive Loop Vehicle Detection Solutions

#### Eberle Design Inc (EDI) / Reno A&E (RAE) Provide Core Competencies for ALL Parking & Access Control Applications

- RAE & EDI are the Global Leaders in Inductive Loop-Based Vehicle Detection
- Over 56 years of combined skill & expertise with Inductive Loop Technology
- Multiple opportunities for inductive loop technology →
- We're the **GOLD** standard in vehicle detection with >99% count & presence accuracy levels
  - ✓ More than 1.5 million inductive loop detectors installed nationwide
  - ✓ Reliability of loops cannot be replicated by other above or below ground technologies
  - ✓ The cost to maintain prefabricated loops is far less than any other vehicle detection technology

- Parking structures
- Controlled access facilities
- Gated communities
- Warehouse facilities with transportation door(s) access
- Drive through retail locations

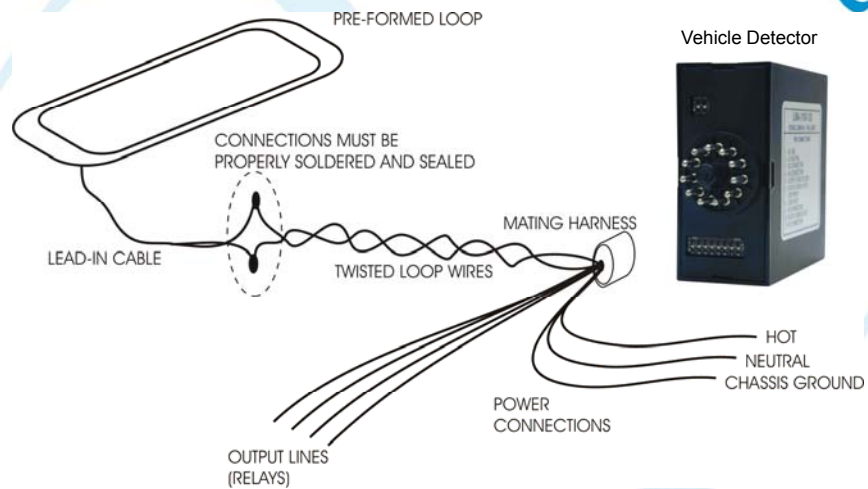


# THE INDUCTIVE LOOP SYSTEM

**“THE GOLD STANDARD” &  
ACCURACY BENCHMARK  
FOR VEHICLE DETECTION!**



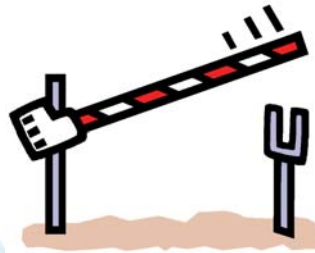
## The Inductive Loop System - Vehicle Detectors & Prefabricated Loops



## System Loop Design & Application Considerations

- **Loop Design Considerations**

- Sliding Gates & Swing Gates
- Bollard Systems
- Parking Arms
- Parking Ticket Dispensers
- Parking/Count Systems
- Automatic Roll-up Doors
- Drive-thru Systems
- Automatic Vehicle Identification (AVI)



## Outputs, Voltages, Diagnostics, LED Indicators, Frequencies . . .

- **An Abundance of Detector Features & Options**

- Models available that operate on 12 VDC / 24 VDC / 24 VAC, 120 VAC, or 240 VAC input power
- LEDs indicates current status state of power, detect outputs and loop faults
- Fail-Safe and Fail-Secure versions
- Relay outputs:
  - Limited Presence or Infinite Presence
  - Pulse-on-Entry or Pulse-on-Exit
  - Fault Output
- Delay Outputs for two seconds or Extend Outputs for 2, 5 or 10 seconds



## Outputs, Voltages, Diagnostics, LED Indicators, Frequencies . . .

### • An Abundance of Detector Features & Options (Cont.)

- Four selectable loop frequencies
- Multiple levels of sensitivity
- Sensitivity Boost for applications where high-bed vehicles might be encountered
- Detect Memory feature maintains detection during momentary power interruptions of up to two seconds
- Diagnostic Loop Fault History in Non-Volatile Memory – Able to review prior loop fault



## Outputs, Voltages, Diagnostics, LED Indicators, Frequencies . . .

### • FAIL-SAFE & FAIL-SECURE OPERATION



- **Fail-Safe Operation**
  - During a power loss or loop failure, the application such as a gate or parking arm will open to allow "safe" entry or exit.
  - Relay "A" N.O. contacts close. Relay "A" N.C. contacts open

- **Fail-Secure Operation**

- During a power loss or loop failure, the application such as a gate or parking arm will stay closed providing a "secure" environment.
  - Relay "A" N.O. contacts close. Relay "A" N.C. contacts open
- Applications: Airports, Prisons, Police Stations, etc.



## Outputs, Voltages, Diagnostics, LED Indicators, Frequencies . . .

### • PRIMARY OUTPUTS: INFINITE AND LIMITED PRESENCE



#### • Infinite Presence

- Used for all access control applications
- As long as Power is applied, the vehicle will always be detected



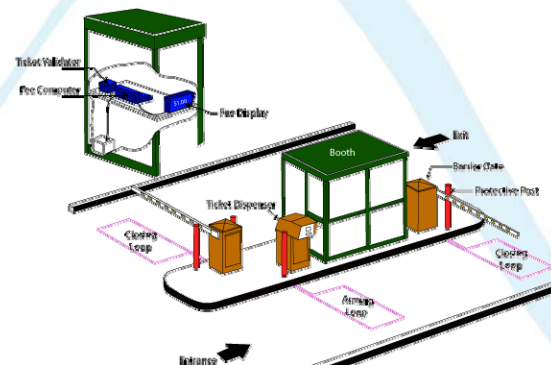
#### • Limited Presence

- The CALL Output will terminate after one to three hours
  - The CALL Output time is dependent on the size of the loop zone and the size of the vehicle
- Used in Traffic Control applications where you may have vehicles parked next to an intersection loop and you would like the detector to drop the CALL Output after "x" amount of time.



## Outputs, Voltages, Diagnostics, LED Indicators, Frequencies . . .

### • PROGRAMMABLE OUTPUTS: PULSE-ON-ENTRY, PULSE-ON-EXIT & LOOP FAULT



#### • Pulse-On-Entry

- The Output activates upon the vehicle entering the loop zone with a 125ms pulse
- Used on arming loops (ticket dispensers, keypads, etc.)

#### • Pulse-On-Exit

- The Output activates upon the vehicle exiting the loop zone with a 125ms pulse
- Used for closing loops to ensure the vehicles have cleared the loop zone

#### • Loop Fault

- The Output will initiate when there is an existing Loop Fault
- Used to trigger a modem or system device that can send a message or an alert to indicate the location of the loop fault





## Outputs, Voltages, Diagnostics, LED Indicators, Frequencies . . .

### • DELAY AND EXTENSION TIMERS



#### • Delay Timer

- Output is delayed for 2 seconds upon the vehicle entering the loop zone
  - Ensures that a vehicle has stopped completely
- Used in drive-thru applications where unwanted vehicles, such as moving bikes or scooters, do not get detected

#### • Extension Timer

- Programmable for either 2, 5 or 10 seconds of extension time
  - The Output is extended for either 2, 5, or 10 seconds after the vehicle exits the loop zone
- Used for exit or closing loops to ensure the vehicles have cleared the loop zone



## Outputs, Voltages, Diagnostics, LED Indicators, Frequencies . . .

### • FREQUENCY AND SENSITIVITY SETTINGS

#### • Frequency Settings

- One of four selectable settings (normally in the range of 13 to 150 kilohertz)
- Assists in eliminating crosstalk problems between adjacent loops and loop detectors



#### • Sensitivity Settings

- Assists for small loop zones
- Assists for loops that may not be configured to the optimum inductance range
- Assists in detecting high-bed or high-profile vehicles



#### • Sensitivity Boost Setting

- When turned ON, it boosts the sensitivity level 2 times higher only during the CALL (Output)
  - It returns to the selected sensitivity level once the vehicle leaves the loop zone
- Assists in detecting high-bed, high-profile and vehicles with trailers



## Outputs, Voltages, Diagnostics, LED Indicators, Frequencies . . .

### • CALL OUTPUT MEMORY AND NON-VOLATILE LOOP FAULT MEMORY

#### • CALL Output Memory

- This feature is always ON
  - If a vehicle is over the loop zone during the CALL Output state, and then power is interrupted momentarily for up to 5 seconds, the vehicle detector will remain in the CALL output state
  - Excellent feature for areas that have unstable power



#### • Non-Volatile Loop Fault Memory

- This feature is always ON
- Displays the type of Loop Fault last encountered even if power goes out for any length of time
  - Indicates OPEN and SHORTED Loops
    - The EDI DEFLECTOMETER™ Series also indicate a third fault, which is a Sudden Change in Loop Inductance Exceeding 25% of the nominal inductance.



## Single Channel Detection Solutions – RAE Box Enclosure Type

### AX Series

- One Programmable Output
- External programming switches



### B Series

- Two Programmable Outputs
- Internal programming switches



### BX Series

- Two Programmable Outputs
- External Programming Switches



### BXC Series

- Two Programmable Outputs
- Compact Enclosure Design
- External Programming Switches



### BX-LP Series

- Two Programmable Outputs
- Ultra Low Power (draws less than 2 milliamps)
- For Solar & Battery Back-up Applications





## Single Channel Detection Solutions – RAE Plug-in Type

### H Series

- Two Programmable Outputs
- Low Voltage version, 12/24 VDC and 12/24 VAC



### J Series

- Two Programmable Outputs
- Low Voltage version, 12/24 VDC and 12/24 VAC
- Universal Mount with standoffs in each corner



### K Series

- Two Programmable Outputs
- 120 & 240 VAC versions



## Dual Channel Detection Solutions – RAE Box Enclosure Type

### AX2 Series

- One Programmable Output
- External Programming Switches
- Single or Dual 11-Pin Amphenol Connector

### AX2-DL Series

- External Programming Switches
- Single or Dual 11-Pin Amphenol Connector



Single Channel Detection Solutions – EDI

## The DEFLECTOMETER™ Series

### The DEFLECTOMETER™ Technology . . .

- Displays the relative signal strength of the CALL (output) while a vehicle is in the detection zone
- Updates dynamically as the sensitivity level and other options are changed
- Displays the nominal loop frequency using a built-in frequency meter



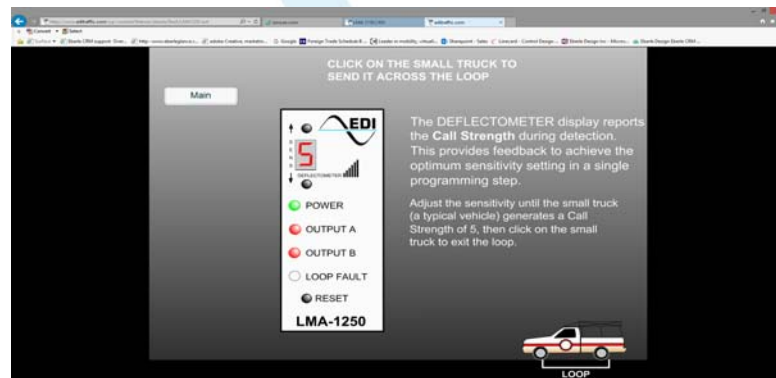
*All Knowing – All Telling*



Single Channel Detection Solutions – EDI

## THE DEFLECTOMETER™ SERIES

Our EDI DEFLECTOMETER™ INTERACTIVE DEMO at [editraffic.com/access-control](http://editraffic.com/access-control)



Single Channel Detection Solutions – EDI

## The DEFLECTOMETER™ Series

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- Displays the relative signal strength of the CALL (output) while a vehicle is in the detection zone
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## All Knowing – All Telling

Single Channel Detection Solutions – EDI  
Box Enclosure Type

## The DEFLECTOMETER™ Series



### LMA-1150 Series

- One Programmable Output
- Rear External programming switches



### LMA-1250 Series

- 2 Programmable Outputs
- Rear External programming switches



### LMA-1250-LP

- For Solar & Battery Back-up Applications
- Two Programmable Outputs
- Ultra Low Power (draws less than 2 milliamps)
- Rear External programming switches



Visit our Interactive Demo for each of our EDI Products at:  
<http://www.editraffic.com/access-control/>



Single Channel Detection Solutions – EDI  
Plug-in Type

## The DEFLECTOMETER™ Series



### LMA-1400 Series

- Two Programmable Outputs
- PCB programming switches
- Three Connector Options:
  - 10-Pin Male Molex
  - 10-Pin Female Molex
  - 10-Pin Block Terminal



### LMA-1800 Series

- Two Programmable Outputs
- Low Power Model, LMA-1800-LP
- PCB programming switches
- 10-Pin Female Molex

Visit our Interactive Demo for each of our EDI Products at:  
<http://www.editraffic.com/access-control/>



Anti-Tailgating Vehicle Detectors for Exact Counts

### L-ATG - Single Channel with Directional Logic

- Provides single lane counting
- Missed vehicle counts means potential lost revenue
- Counts bumper to bumper passenger vehicles
- Detects multiple vehicles entering or exiting during a single gate cycle
- Provides single lane counting
- Counts vehicles accurately even if two vehicle are over the same loop at the same time
- Accurately audits revenue collection at parking facilities



### DL-ATG Dual Channel with Directional Logic Detectors

- Provides single or dual lane directional counting
  - DL-ATG-1
  - DL-ATG-2



## Automatic Vehicle Identification (AVI) Systems - RAE

- AVI Receivers identify vehicles equipped with a uniquely coded AVI Transmitter
- Up to 19,683 Individual Codes
- AVI System utilizes standard roadway loops
- Detector & Receiver in one enclosure – BT-AVI
- Transmitter sizes for cars/trucks and motorcycles



## System Loop Design Products

- **PREFABRICATED LOOPS**
- **LOOP WIRE**
- **LEAD-IN CABLE**
- **BACKER ROD**

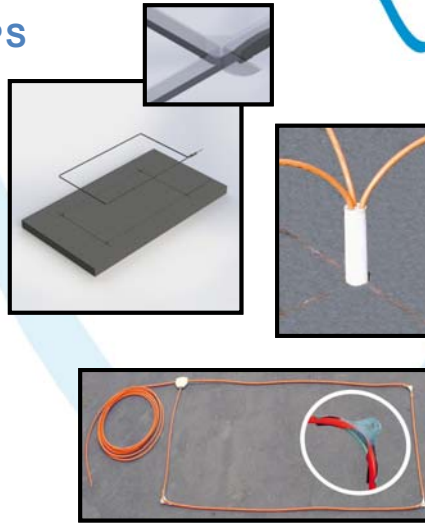
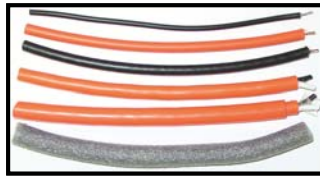


## Prefabricated Loops, Loop Wire & Lead-in Cable Cross-Linked Polyethylene - XLPE

### • PREFABRICATED LOOPS

- ✓ **PLA SERIES** *New Product!*
  - Saw cut type for 1/8" saw cuts or larger
- ✓ **PLB SERIES**
  - Saw cut type for 1/4" saw cuts or larger
- ✓ **PLH SERIES**
  - Direct burial type – Hot Asphalt or Cement
- ✓ **PLH-R SERIES**
  - Direct burial type – Cement, Dirt, Gravel, mud, etc.

### • LOOP WIRE & CABLE



## Prefabricated Loops, Loop Wire & Lead-in Cable Cross-Linked Polyethylene - XLPE

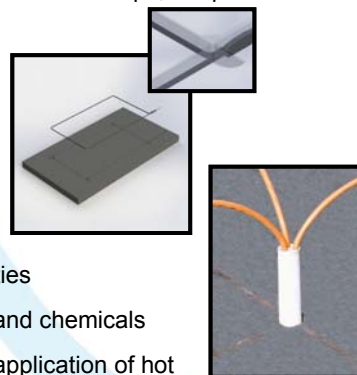
### WHY PREFABRICATED LOOPS?

Our Formula for Long Lasting Reliability for Prefabricated Loops, Loop Wire and Lead-in Cable and Equals:

- XLPE (Cross- Linked Polyethylene Insulation)
- Water blocking gel
- Tinned copper stranded wire

#### **XLPE Insulation provides:**

- Excellent thermal, electrical & physical properties
- Outstanding resistance to abrasion, moisture and chemicals
- Suitable for high temperatures such as direct application of hot asphalt



**10 YEAR WARRANTY ON PREFABRICATED LOOPS**





Prefabricated Loops, Loop Wire & Lead-in Cable  
Cross-Linked Polyethylene - XLPE

### WHY PREFABRICATED DIRECT BURIAL LOOPS?

- **COST EFFECTIVE**
  - No saw cutting expense
  - Reduced labor cost
  - No replacement cost
  - No maintenance cost
  - Extremely long life cycle
  - Promotes longer roadway life



**10 YEAR WARRANTY ON PREFABRICATED LOOPS**



Prefabricated Loops, Loop Wire & Lead-in Cable  
Cross-Linked Polyethylene - XLPE

### WHY PREFABRICATED LOOPS?



- 1) .035" XLPE Outer Jacket
- 2) .030" XLPE Middle Jacket
- 3) Moisture Resistant Mylar Binder
- 4) Water Block Gel
- 5) .020" XLPE Conductor Insulation

- Outer Jacket relieves stress on Inner Jacket and wire
- Minor nicks and cuts in the Outer Jacket will not reflect into the Second Jacket

**10 YEAR WARRANTY ON PREFABRICATED LOOPS**



## Prefabricated Loops, Loop Wire & Lead-in Cable Cross-Linked Polyethylene - XLPE

### WHY PREFABRICATED SAW CUT LOOPS?

- A PREFABRICATED SAW CUT LOOP IS STRONGER AND MUCH MORE DURABLE THAN CREATING A LOOP ZONE WITH LOOP WIRE
- MANUFACTURED IN A CONTROLLED ENVIRONMENT
- COST EFFECTIVE
- LONG LIFE CYCLE
- EASY TO HANDLE, SHIP, AND INSTALL



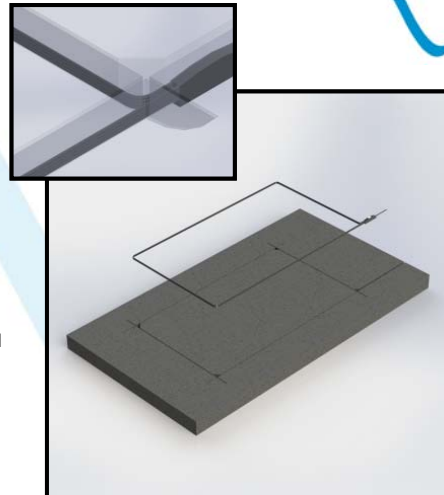
**10 YEAR WARRANTY ON PREFABRICATED LOOPS**



### **NEW PRODUCT**

#### PLA Series – Prefabricated Loops – Saw Cut Type

- Installs in 1/8" wide & larger saw cuts
- Ribbon cable designed to maximize durability and maintain a flexible form that is easy to install and handle
  - No need to cut 45° corners
- Constructed with optimal thickness of XLPE insulation for trouble-free lifecycle
- Super Lightweight
- Design ensures an exact fit of the saw cut
- All splice connections are soldered, sealed and tested during fabrication
- Tested then soaked in salt water tanks for a minimum of 3 days, then tested again

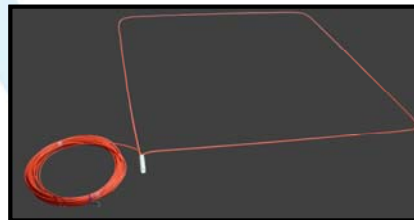
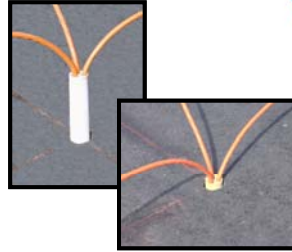


**10 YEAR WARRANTY ON PREFABRICATED LOOPS**



## PLB Series – Prefabricated Loops – Saw Cut Type

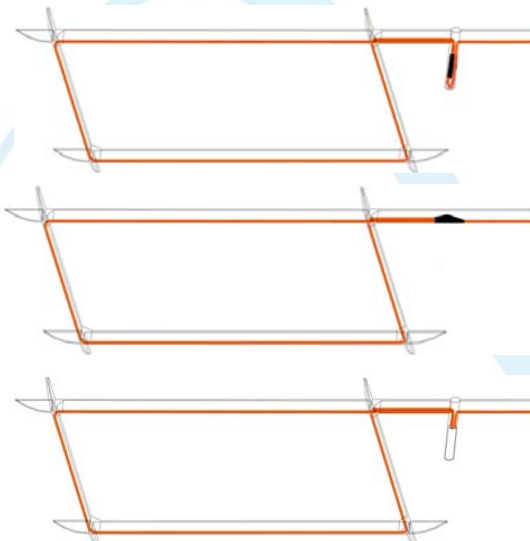
- Installs in 1/4" wide & larger saw cuts
- Designed to maximize durability and maintain a flexible form that is easy to install and handle
- Constructed with optimal thickness of XLPE insulation for trouble-free lifecycle
- Design ensures an exact fit of the saw cut
  - No need to cut 45° corners
- Cables are filled with water block gel to prevent water penetration
- All splice connections are soldered, sealed and tested during fabrication
- Tested then soaked in salt water tanks for a minimum of 3 days, then tested again



**10 YEAR WARRANTY ON PREFABRICATED LOOPS**



## PLA & PLB Series – Prefabricated Loops – Easy Installation



PLA Saw Cut  
With 1" Hole

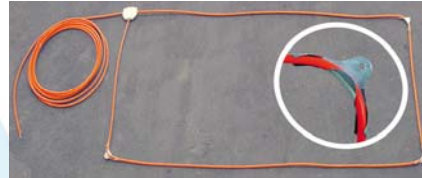
PLA Saw Cut  
in Lead-in Slot

PLB Saw Cut  
With 1" Hole



### PLH Series – Prefabricated Loops – Direct Burial Type

- Designed to be overlaid with hot asphalt or embedded in concrete
- Designed to maximize durability and maintain a flexible form that is easy to install and handle
- Constructed with optimal thickness of XLPE insulation for trouble-free lifecycle
- Cables are filled with water block gel to prevent water penetration
- Can be configured to any loop geometry
- All splice connections are soldered, sealed and tested during fabrication
- Tested then soaked in salt water tanks for a minimum of 3 days, then tested again



**10 YEAR WARRANTY ON PREFABRICATED LOOPS**



### PLH-R Series – Prefabricated Loops – Direct Burial Type

- Designed for direct burial in dirt or gravel roadways
- High visibility (red) outer jacket is formulated from Thermoplastic Elastomer (TPE) for superior abrasion resistance
- Constructed with optimal thickness of XLPE insulation for trouble-free lifecycle
- Designed to maximize durability and maintain a flexible form that is easy to install and handle
- Cables are filled with water block gel to prevent water penetration
- Can be configured to any loop geometry
- All splice connections are soldered, sealed and tested during fabrication
- Tested then soaked in salt water tanks for a minimum of 3 days, then tested again

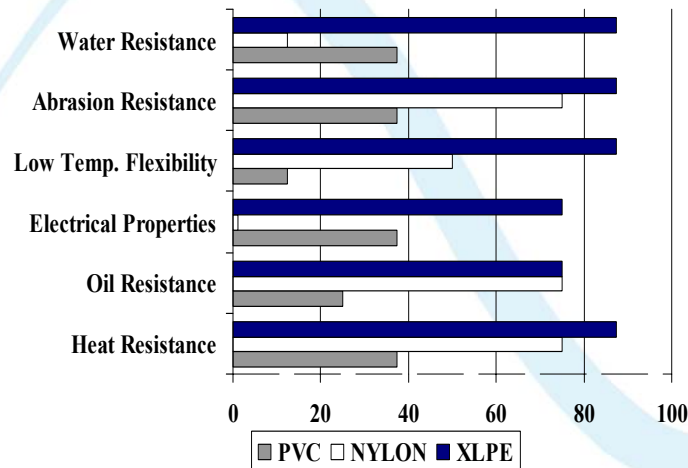


**10 YEAR WARRANTY ON PREFABRICATED LOOPS**



Prefabricated Loops, Loop Wire & Lead-in Cable  
Cross-Linked Polyethylene - XLPE

Cross-linked polyethylene (XLPE) has a melting point of 426°F



Prefabricated Loops, Loop Wire & Lead-in Cable  
Cross-Linked Polyethylene - XLPE

Recommended RAE Loop Wire & Backer Rod products for Access Control  
“Saw Cut” Applications:

- LW-120 Loop Wire – 20 AWG. For use in 1/8" saw cuts and larger
- LW-116 Loop Wire – 16 AWG. For use in 1/4" saw cuts and larger
- LW-116-P Loop Wire – 16 AWG. For use in 1/4" saw cuts and larger
- LW-116-S Loop Wire – 16 AWG. For use in 1/4" saw cuts and larger
- BR-250 Backer Rod (Industrial Foam) - For use in 1/8" or 1/4" saw cuts
- BR-375 Backer Rod (Industrial Foam) – For use in 1/2" saw cuts



## QUESTIONS / DISCUSSION

10 YEAR WARRANTY ON PREFABRICATED LOOPS



## KEY CONTACTS AT EDI & RAE

### Strategic North American & International Partners

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