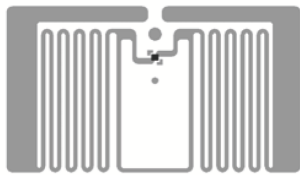




# ALN-9816

## “PEARL” JEWELRY/COSMETICS INLAY

The Alien Technology® ALN-9816 “Pearl” RFID inlay is designed for use in jewelry and cosmetic applications where the tag may be in close proximity to small metal or metallic coated objects



### Applications

- Jewelry tagging
- Use with small metallic objects
- Cosmetics

| FEATURE  | DESCRIPTION  | BENEFIT   |
|--|--|---|
| Small form factor, non-near field read tag                           | Despite its diminutive size (22 x 12.5mm), this tag uses conventional long range UHF antenna unlike many other competitive tag solutions.                        | Offers read/write distances in the order of feet/meters unlike other competitive tags that are near-field and only read an inch or two.         |
| Tuned for metal and cosmetics  | Designed to be in close proximity to metal or metallic surfaces.   | Uses the metal surfaces to “amplify” the read/write distance of the tag.  |
| New error correcting Sentinel™ Memory and best-in-class reliability. | A unique and robust error correcting memory architecture fixes single bit errors and flags dual bit errors. 200,000 write cycles, two times that of competitors. | Provides customers reassurance the stored data is protected and data loss/corruption minimized. More robust memory for high-write applications. |

### Features:

- › Designed to meet EPCglobal Gen2 (V1.2.0) and ISO/IEC 18000-6C
- › Worldwide operation in the RFID UHF bands (860-960 MHz)
- › 512-Bits of NVRAM Memory
  - 128-EPC Bits
  - 128 User Bits
  - 48 Bit Unique TID
  - 32 Bit Access and 32 bit Kill Passwords
- › User Memory can be Block Perma-Locked as well as read password protected in 32 Bit Blocks
- › Class leading read and write performance
- › *BlastWrite™* and *QuickWrite™* mass-encoding
- › Dynamic Authentication™ - anti-cloning/anti-counterfeit technology
- › Available in high-yield, high capacity dry/wet inlay rolls

### Product Overview:

Powered by Alien®’s break-through **Higgs™-EC UHF RFID IC** and **innovative “Pearl” antenna design**, the ALN-9816 delivers industry leading EPC Gen 2 performance and reliability for retail jewelry and cosmetics especially when tagging in compact and highly dense areas.

With its Higgs™-EC core, the Pearl delivers next generation read and write performance, yet is completely **optimized for the highest volume enterprise and retail applications.**

An optimized memory footprint includes a 32-bit TID, a **48-bit Unique TID for authentication** and **next generation serialization** applications, a 128-bit EPC memory bank, 128-bits of user memory for distributed data applications, and **password protected read and write** support capabilities to prevent unauthorized viewing and modification of the tag’s data.

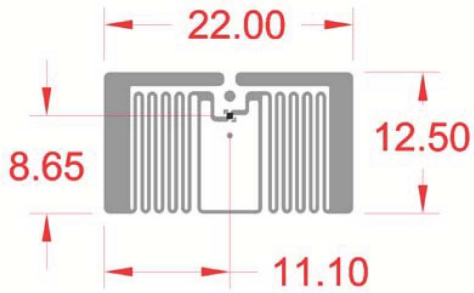
ALN-9816 inlays are World Tag compliant, enabling consistent operation across the diverse frequencies of the Americas, Europe, Middle East, Asia, and Africa.



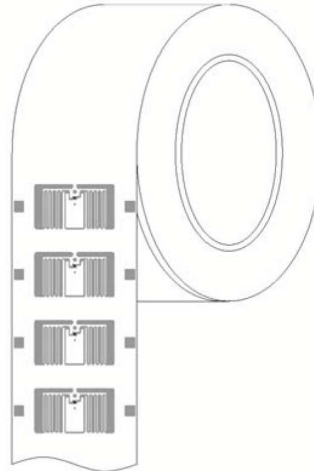
## ALN-9816 Pearl Inlay

All dimensions in millimeters unless specified otherwise

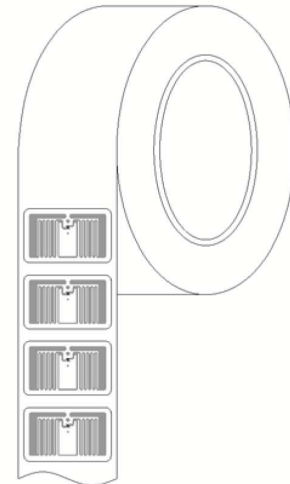
### ALN-9816 Antenna Size



### ALN-9816 Inlay Orientation



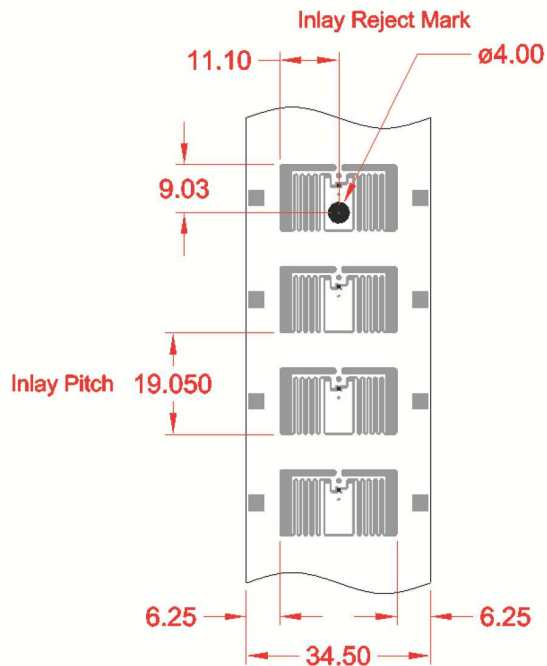
ALN-9816-R  
(Dry Unslit Roll)



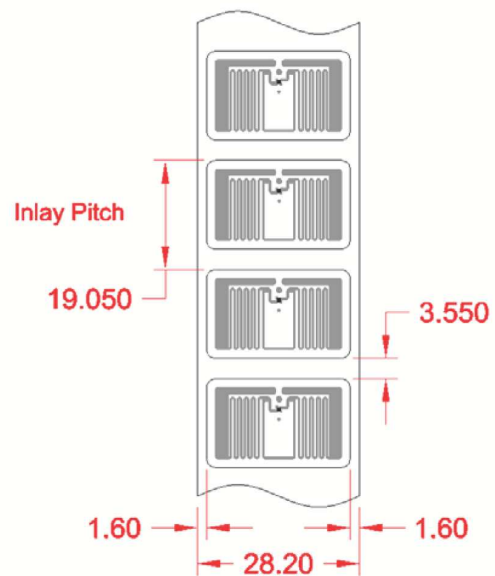
ALN-9816-WRW  
(White Wet Inlay)

Standard Alien Inlay rolls unwind with metal antenna side facing outward, with respect to the core.

### ALN-9816 Inlay Specification



ALN-9816-R  
(Dry Unslit Roll)



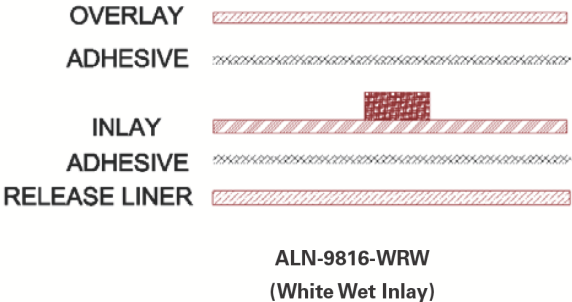
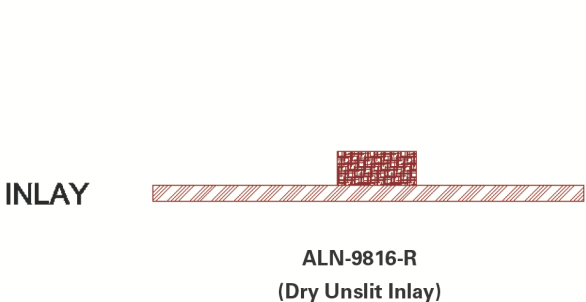
ALN-9816-WRW  
(White Wet Inlay)



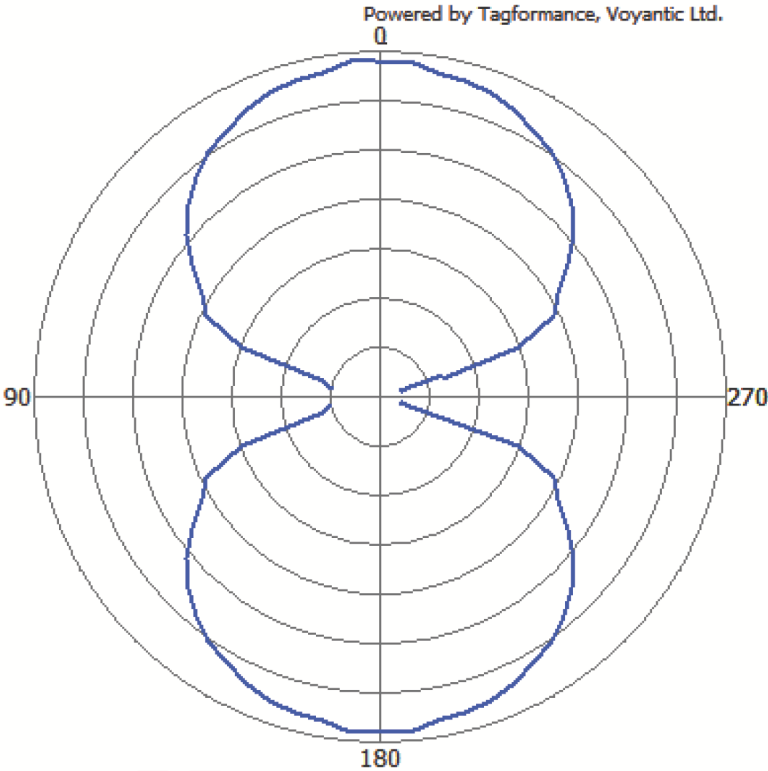
ALN-9816 Inlay Stackup

| DRY INLAY THICKNESS ±10% |        |
|--------------------------|--------|
| Over Antenna             | 0.06mm |
| Over Chip                | 0.24mm |

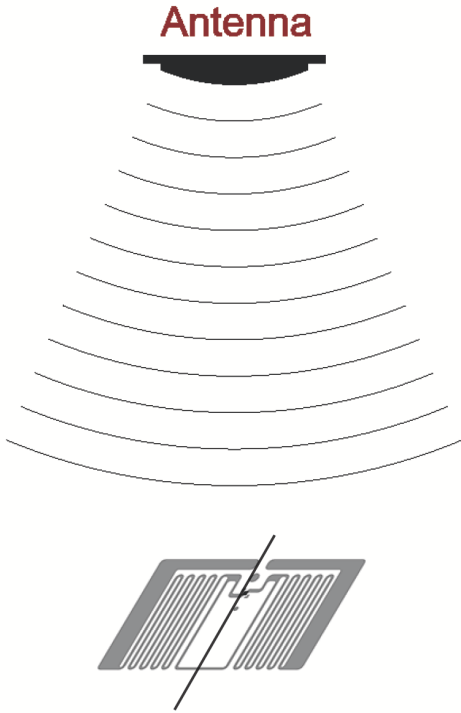
| WHITE WET INLAY THICKNESS ±10% |        |
|--------------------------------|--------|
| Over Antenna                   | 0.16mm |
| Over Chip                      | 0.32mm |



ALN-9816 Inlay Angular Sensitivity



Angular Sensitivity  
(Relative Read Range vs. Orientation)



Angular Sensitivity  
Inlay is rotated in the x, y, plane about the z axis

## ALN-9816 Specifications

### Dry Inlay

|                    |                  |
|--------------------|------------------|
| Antenna Width      | 0.866" [22mm]    |
| Antenna Length     | 0.492" [12.5mm]  |
| Web Width          | 1.358" [34.5mm]  |
| Web Pitch          | 0.750" [19.05mm] |
| Core Width         | 1.358" [34.5mm]  |
| Core ID            | 6" [152.4mm]*    |
| Core Material      | Fiberboard       |
| Inlays per Roll    | 15,000 Nominal   |
| Maximum Roll OD    | < 12" [304.8mm]  |
| Roll Labeling Data | Roll #, Quantity |

### Wet Inlay

|                                  |                                       |
|----------------------------------|---------------------------------------|
| Inlay Width                      | 0.984" [25mm]                         |
| Inlay Length                     | 0.610" [15.5mm]                       |
| Web Width                        | 1.110" [28.2mm]                       |
| Web Pitch                        | 0.750" [19.05mm]                      |
| Core Width                       | 1.110" [28.2mm]                       |
| Core ID                          | 6" [152.4mm]*                         |
| Core Material                    | Fiberboard                            |
| Inlays per Roll                  | 15,000 Nominal                        |
| Maximum Roll OD                  | < 16" [406.4mm]                       |
| Roll Labeling Data               | Roll #, Quantity                      |
| White                            | TT Printable White Film Only          |
| Overlay Adhesive                 | General Purpose Permanent             |
| Inlay Adhesive                   | General Purpose Permanent             |
| Adhesive Application Temperature | > +25°F [-4°C]                        |
| Adhesive Service Temperature     | -40°F to +200°F<br>[-40°C to +93.3°C] |
| Release Liner                    | 40# SCK                               |

\* Shipped with 6" to 3" plastic core adapter

November 3, 2017

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HANDLING PRECAUTIONS Observe standard handling practices to minimize ESD.

DISCLAIMER Application recommendations are guidelines only - actual results may vary and should be confirmed. This is a general purpose product not designed or intended for any specific application.

This product is covered by one or more of the following U.S. patents: 7967204, 7931063, 7868766, 7737825, 7716208, 7716160, 7688206, 7659822, 7619531, 7615479, 7598867, 7580378, 7576656, 7562083, 7561221, 7559486, 7559131, 7544451, 7551141, 7542301, 7542008, 7531218, 7522055, 7506610, 7489248, 7453705, 7425467, 7417306, 7411503, 7385284, 7377445, 7364084, 7353598, 7342490, 7324061, 7321159, 7301458, 7295114, 7288432, 7265675, 7262686, 7260882, 7253735, 7244326, 7218527, 7214569, 7199527, 7193507, 7173528, 7172910, 7172789, 7141176, 7113250, 7101502, 7080444, 7070851, 7068224, 7046328, 6998644, 6988667, 6985361, 6980184, 6970219, 6952157, 6942155, 6933848, 6927085, 6816380, 6780696, 6731353, 6693384, 6683663, 6665044, 6657289, 6623579, 6606247, 6606079, 6590346, 6586338, 6566744, 6555408, 6527964, 6479395, 6468638, 6420266, 6316278, 6291896, 6281038. Other patents pending.

This product is licensed under patents of Round Rock Research, LLC, for use solely with UHF RFID Readers (such as Alien reader products) that are licensed under an agreement with Round Rock Research, LLC.

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### Environmental

|                      |  |
|----------------------|--|
| Shelf Life           | Dry Inlays: 5 years at +77°F<br>[+25°C] @ 40% RH<br><br>Wet Inlays: 2 years at +77°F<br>[+25°C] @ 40% RH |
| Recommended Storage  | +77°F [+25°C] @ 40% RH   |
| Storage Limits       | -13°F to 122°F<br>[-25°C to +50°C]<br>20% to 90% RH<br>Non-condensing                                    |
| Operating Limits     | -40°F to +158°F<br>[-40°C to +70°C]<br>20% to 90% RH<br>Non-condensing                                   |
| Bend Diameter        | > 1.97" [50mm]   |
| Pressure             | < 5N/mm <sup>2</sup>   |
| Drop Resistance      | Per ASTM D5276   |
| Write Cycles         | 200,000 @ 25°C   |
| RoHs                 | 2002/95/EC (RoHS 1), 2011/65/<br>EU (RoHS 2), 2015/863 (RoHS<br>10)                                      |
| REACH                | EU 143/2011, EU 125/2012,<br>Annex XIV of EC no. 1907/2006   |
| ESD Limit- HBM / CDM | 5.0kV / 1.5kV  |

### RFID

|                     |   |
|---------------------|---|
| Protocols Supported | ISO/IEC 18000-6C<br>EPCglobal Class 1 Gen 2 |
| Integrated Circuit  | Alien Higgs™-EC                             |
| Operating Frequency | 840–960 MHz                                 |
| EPC Size            | 128 Bits                                    |
| User Memory         | 128 Bits                                    |
| TID                 | 32 Bits                                     |
| Unique TID          | 48 Bits                                     |
| Access Password     | 32 Bits                                     |
| Kill Password       | 32 Bits                                     |