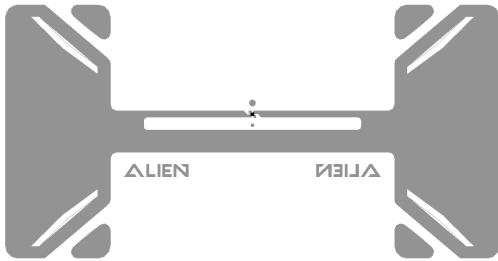




# ALN-9874

## “TREAD” TIRE AND AUTOMOTIVE INLAY

Fast-track and stay on course with the Alien Technology® ALN-9874 “Tread” RFID inlay for automotive tire label and high-dielectric material applications requiring extra-high sensitivity



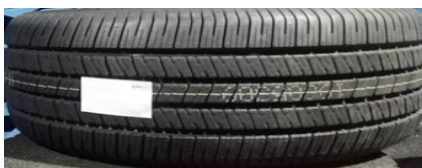
### Applications

- Automotive Tire Label
- Reusable containers
- High-dielectric materials
- Metal-filled objects

FEATURE	DESCRIPTION	BENEFIT
Performance tuned for automotive rubber and high-dielectric materials	80x40 mm size, compatible with all standard far-field RFID reader antennas (fixed and handheld)	Exceptional performance for traditionally challenging RF materials
Reliable read / write performance with Sentinel™ memory	Bit error correction, improved read/write sensitivity, robust memory retention and 200,000 write cycles (2X that of competition)	Robust reliability of stored data & added protection against data loss/corruption

### Features:

- › Worldwide operation in all RFID UHF bands (860-960 MHz)
- › Global GS1 Class 1 Gen 2 (V1.2.0) and ISO/IEC 18000-6C compliance
- › Class leading read and write performance
- › 512 bits of NVRAM Memory
  - Up to 128 EPC bits (96-bits nominal)
  - 128 User bits
  - 48 bit Unique TID
  - 32 bit Access and 32 bit Kill passwords
- › User Memory may be Block Perma-Locked as well as read password protected in 32 bit blocks
- › Low power operation for both read and write
- › *BlastWrite™* and *QuickWrite™* mass-encoding
- › Dynamic Authentication™ - anti-cloning/anti-counterfeit technology
- › Available in high-yield, high capacity dry/wet inlay rolls



### Product Overview:

Designed for Automotive Tire, High-Dielectric, General Asset Management & Supply Chain applications, the 80x40 mm **Higgs™ -EC UHF RFID IC** based “**Tread**” **antenna design** offers robust performance on traditionally RF challenged assets and materials.

Applications include (but not limited to):

- Automotive tire external labeling
- High-dielectric material tagging
- Metal-filled objects
- Applications requiring extra high sensitivity

Enhanced memory footprint includes a **48-bit Unique TID for authentication** and **serialization** applications and **password protected read and write** support to prevent unauthorized viewing and modification of the tag’s data.

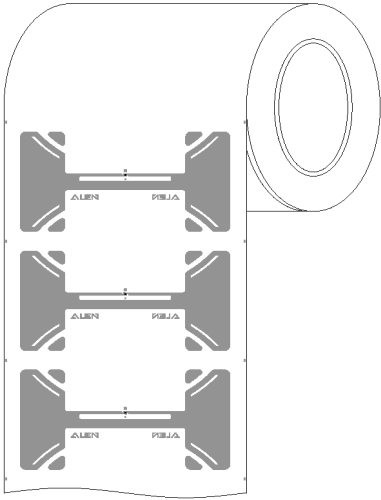
ALN-9874 inlays are World Tag compliant, enabling consistent operation across the diverse frequencies of the Americas, Europe, Middle East, Asia, and Africa.



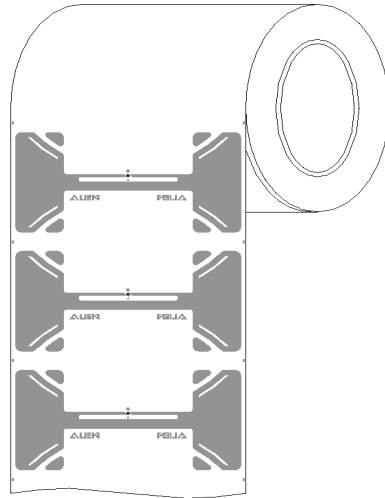
# ALN-9874 "Tread" Inlay

All dimensions in millimeters unless otherwise specified

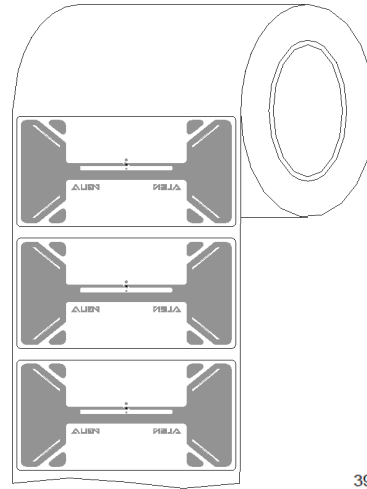
## ALN-9874 Inlay Orientation



**ALN-9874-R**  
(Dry Unslit Roll)



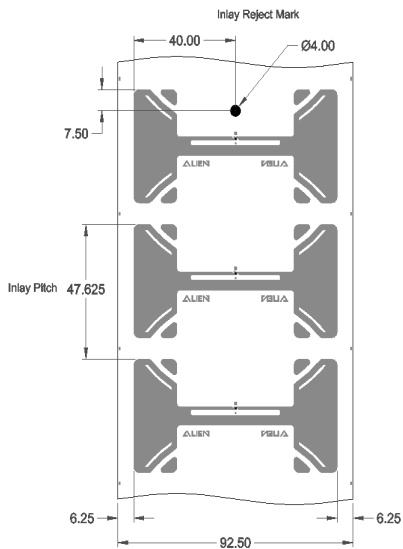
**ALN-9874-SR**  
(Dry Slit Roll)



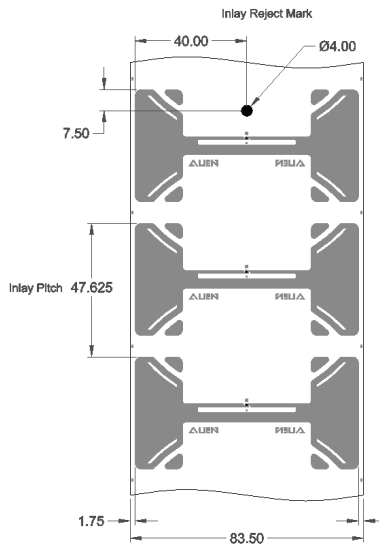
**ALN-9874-WRW**  
(White Wet Inlay)

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

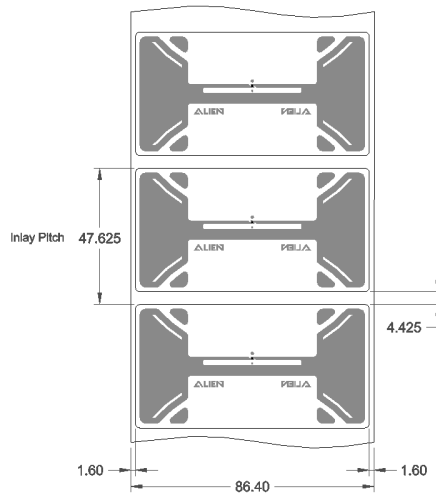
## ALN-9874 Inlay Specification



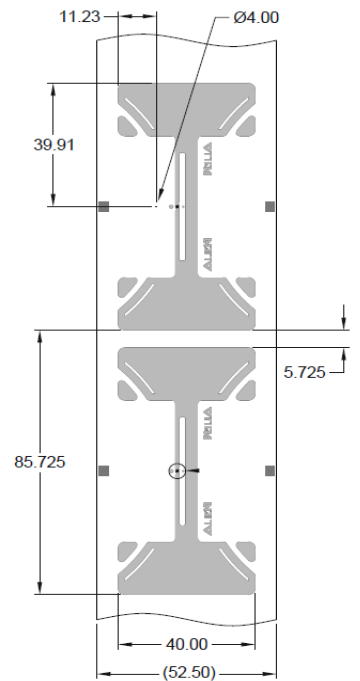
**ALN-9874-R**  
(Dry Unslit Roll)



**ALN-9874-SR**  
(Dry Slit Roll)



**ALN-9874-WRW**  
(White Wet Inlay)

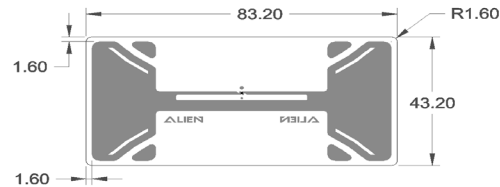
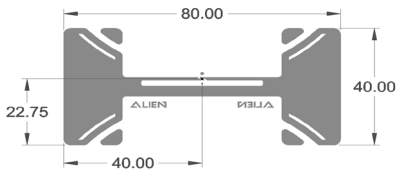


**ALN-9874-90R**  
(Dry Unslit 90 Degree Rotate)





### ALN-9874 General Dimensions



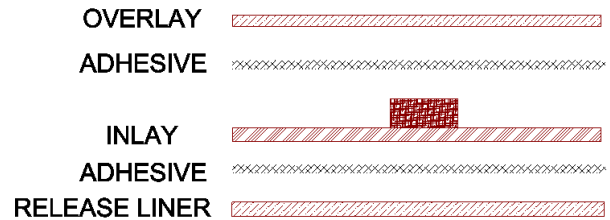
### ALN-9874 Inlay Stackup

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



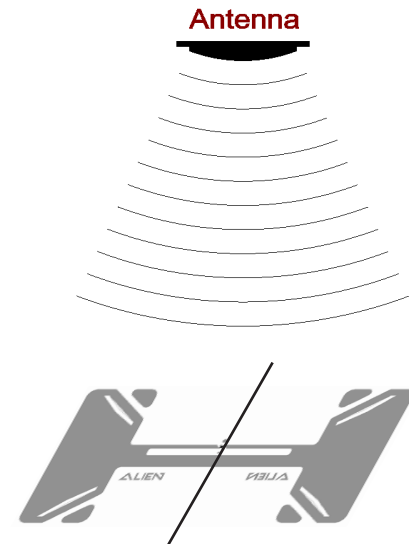
ALN-9874-R  
(Dry Unslit Inlay)



ALN-9874-WRW  
(White Wet Inlay)

### ALN-9874 Inlay Angular Sensitivity & Performance

Read Range		AVG.
Alien 80x40 Tire Tag	FCC	22 ft. (7 m)
	ETSI	14 ft (4 m)
Competitor 92x44 Tire Tag	FCC	9 ft (3 m)
	ETSI	6 ft. (2m)



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

Comparative performance on-tire compared to (larger) competitive inlay (FCC operational range 902-928 MHz, ETSI operational range 865-867 MHz).

\*Figures provided for comparative reference, actual results may vary



# ALIEN. ALN-9874 "Tread" Inlay

## ALN-9874 Specifications

### Dry Inlay

Antenna Width	3.149" [80mm]
Antenna Length	1.574" [40mm]
Web Width (-R)	3.642" [92.50mm]
Web Width (-SR)	3.287" [83.50mm]
Web Width (-90R)	2.067" [52.50mm]
Web Pitch	1.875" [47.625mm]
Web Pitch (-90R)	3.375" [85.725mm]
Core Width (-R)	3.642" [92.50mm]
Core Width (-SR)	3.287" [83.50mm]
Core Width (-90R)	2.067" [52.50mm]
Core ID	6" [152.4mm]*
Core Material	Fiberboard
Inlays per Roll (-SR)	10,000 Nominal
Inlays per Roll (-R)	6,800 Nominal
Inlays per Roll (-90R)	4,600 Nominal

### Wet Inlay

Inlay Width	3.276" [83.20mm]
Inlay Length	1.700" [43.20mm]
Web Width	3.401" [86.40mm]
Web Pitch	1.875" [47.625mm]
Core Width	3.401" [86.40mm]
Core ID	6" [152.4mm]*
Core Material	Fiberboard
Inlays per Roll	6,800 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 [-40°C to +93.3°C]
Release Liner	40# SCK

### Environmental

Shelf Life	Dry Inlays: 5 years at +77°F [+25°C] @ 40% RH Wet Inlays: 2 years at +77°F [+25°C] @ 40% RH
Recommended Storage	+77°F [+25°C] @ 40% RH
Storage Limits	-13°F to 122°F [-25°C to +50°C] 20% to 90% RH Non-condensing
Operating Limits	-40°F to +158°F [-40°C to +70°C] 20% to 90% RH 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/EU (RoHS 2), 2015/863 (RoHS 10)
REACH	EU 143/2011, EU 125/2012, Annex XIV of EC no. 1907/2006
ESD Limit- HBM / CDM	5.0kV / 1.5kV

### RFID

Protocols Supported	ISO/IEC 18000-6C GS1 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

\* Shipped with 6" to 3" plastic core adapter  
October 18 2019

Copyright© 2019 Alien Technology LLC. All rights reserved.

Alien, Alien Technology, the Alien Technology logo, Express, Express logo, Higgs, Dynamic Authentication, QuickWrite and BlockWrite are trademarks or registered trademarks of Alien Technology Corporation in the U.S. and other countries.

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, 7554451, 7551141, 7542301, 7542008, 7531218, 7522055, 7500610, 7489248, 7453705, 7425467, 7417306, 7411503, 7385284, 7377445, 7364084, 7353598, 7342490, 7324061, 7321159, 7301458, 7295114, 7288432, 7265675, 7262686, 7260882, 7253735, 7244326, 7218527, 7214569, 7199527, 7193504, 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, 6623599, 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.



Alien Technology  
845 Embedded Way  
San Jose, CA 95138-1030  
866-RFID NOW  
www.alientechnology.com