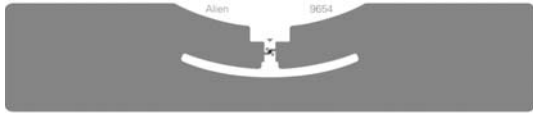


# ALN-9654 G INLAY

The Alien Technology® ALN-9654 “G” is an ultra-high-performance, general-purpose RFID inlay especially well-suited for high-dielectric materials such as windshields and reusable plastic pallets or containers

## Applications



- Windshield glass
- Reusable plastic pallets
- Totes and containers
- Asset management
- High speed motocross and triathlon tagging

FEATURE	DESCRIPTION	BENEFIT
Exceptional performance for high-dielectric mounting	Designed for use on glass, plastics, wood, or other challenging insulator materials	Performance tuned for challenging materials
Multiple frequency optimized sensitivity	Optimized for high performance in all world regions	A worldwide performance tag

## Features:

- > Exceptional performance
- > EPC Gen 2 (v1.2.0) compliant
- > ISO/IEC 18000-6C compliant
- > Worldwide RFID UHF operation (840-960MHz)
- > Higgs™-3 IC with 800-bits of Nonvolatile Memory
  - 32-bit TID
  - 64-bit Unique TID
  - 96-bit EPC Memory, extensible to 480-bits
  - 512-bit User Memory
  - 32-bit Access password
  - 32-bit Kill password
- > Pre-programmed with a unique, unalterable 64-bit serial number (ideal for authentication)
- > User Memory can be Block Perma-Locked
- > User Memory can be Read Password protected in 64-bit blocks, prohibiting unintended Reads without an access password
- > Supports all Mandatory and Optional Gen 2 commands including item level commands
- > Custom commands for high speed programming
- > Available in high-yield, high-capacity dry/wet inlay rolls for high volume converting processes

## Product Overview:

Powered by Alien®’s break-through **Higgs™ 3 UHF RFID IC** and **innovative antenna design**, the ALN-9654 delivers industry leading EPC Gen 2 performance and reliability.

ALN-9654 inlays are **World Tag** compliant, enabling consistent operation across the diverse frequencies of the Americas, Europe, Middle East, Asia, and Africa.

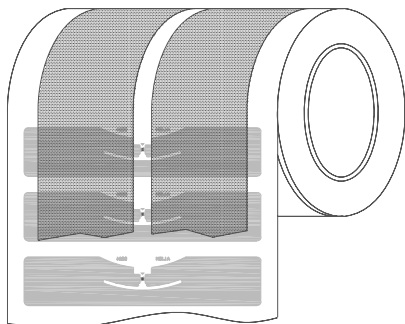
With its Higgs-3 core, the “G” delivers ultra-high, “best-of-breed” performance. It is especially well-suited for challenging materials with high-dielectrics, such as plastic and glass (hence the “G” nickname).

The “G” inlay comprises a rich feature set including a 32-bit TID, a **64-bit Unique TID for authentication and serialization applications**, an **extensible EPC memory bank, 512-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.

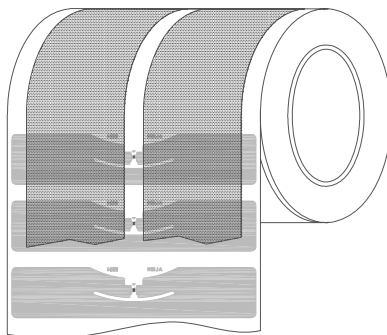


# ALN 9654 G Inlay

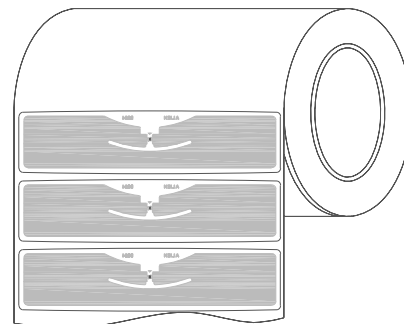
## ALN-9654 Inlay Orientation



**ALN-9654-FR**  
**(Dry Unslit Roll)**



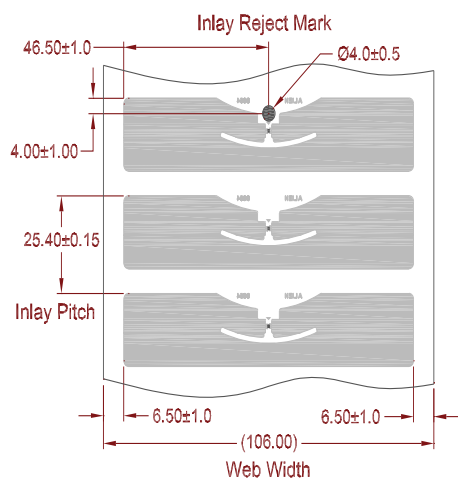
**ALN-9654-FSR**  
**(Dry Slit Roll)**



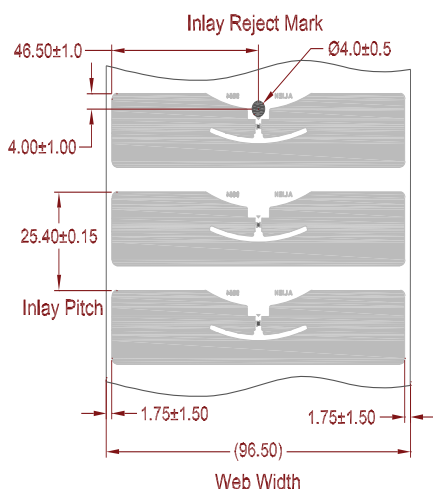
**ALN-9654-FWRW**  
**(White Wet Roll)**

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

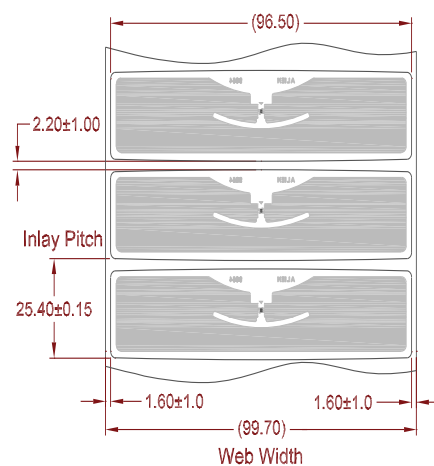
## ALN-9654 Inlay Specification



**ALN-9654-FR**  
**(Dry Unslit Roll)**



**ALN-9654-FSR**  
**(Dry Slit Roll)**



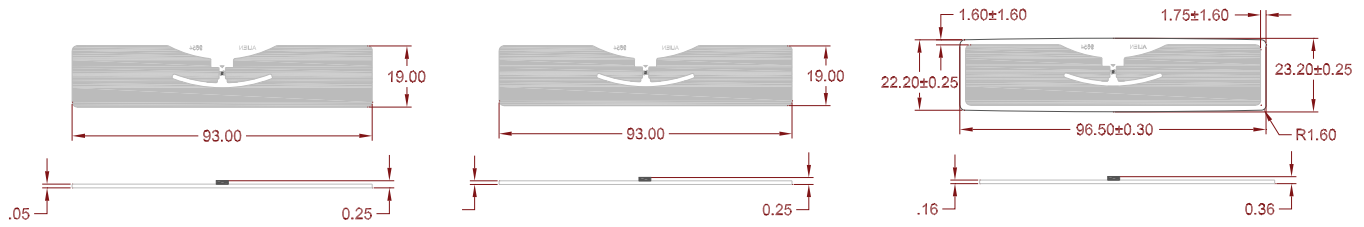
**ALN-9654-FWRW**  
**(White Wet Roll)**





# ALN 9654 G Inlay

## ALN-9654 Inlay General Dimensions



**ALN-9654-FR**  
(Dry Unslit Inlay)

**ALN-9654-FSR**  
(Dry Slit Inlay)

**ALN-9654-FWRW**  
(White Wet Inlay)

## ALN-9654 Inlay Stackup

DRY INLAY THICKNESS, ±10%	
OVER ANTENNA	0.05 mm
OVER CHIP	0.25 mm

DRY INLAY THICKNESS, ±10%	
OVER ANTENNA	0.05 mm
OVER CHIP	0.25 mm

WHITE WET INLAY THICKNESS, ±10%	
OVER ANTENNA	0.16 mm
OVER CHIP	0.36 mm

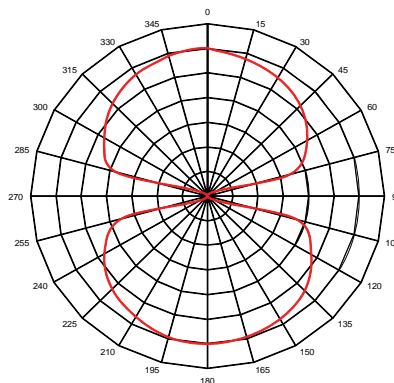


**ALN-9654-FR**  
(Dry Unslit Inlay)

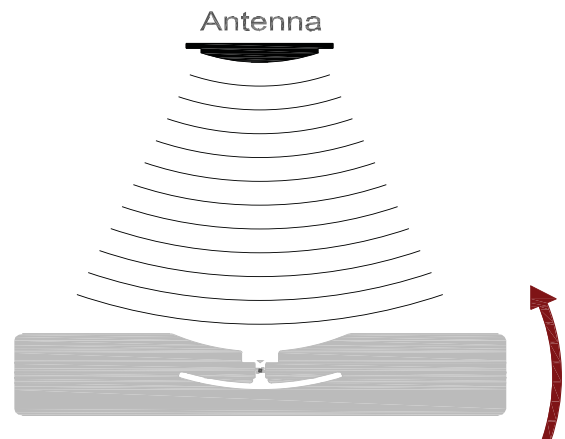
**ALN-9654-FSR**  
(Dry Slit Inlay)

**ALN-9654-FWRW**  
(White Wet Inlay)

## ALN-9654 Inlay Angular Sensitivity



Angular Sensitivity  
(Relative Read Range vs. Orientation)



Angular Sensitivity  
Inlay is rotated in the x, y, plane about the z axis  
(tag shown at 0° with respect to face of antenna)



## ALN 9654 G Inlay

### ALN-9654 Specifications

#### Dry Inlay

Antenna Width	3.66" [93.0mm]
Antenna Length	0.748" [19.0mm]
Web Width (-FR)	4.173" [106.0mm]
Web Width (-FSR)	3.799" [96.5mm]
Web Pitch	1.0" [25.4mm]
Core Width (-FR)	3.799" [96.5mm]
Core Width (-FSR)	4.173" [106.0mm]
Core ID	6" [152.4mm]
Core Material	Fiberboard
Interleaf Material	Paper
Interleaf Width	1.5" [38.1mm]
Inlays per Roll	12,500 Nominal
Maximum Roll OD	< 12" [304.8mm]

#### Wet Inlay

Inlay Width	3.799" [96.5mm]
Inlay Length	0.913" [23.2mm]
Web Width	3.925" [99.7mm]
Web Pitch	1.0" [25.4mm]
Core Width	3.874" [98.4mm]
Core ID	6" [152.4mm]
Core Material	Fiberboard
Inlays per Roll	12,500 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	> +36.5°F [+2°C]
Adhesive Service Temperature	-4°F to +199.4°F [-20°C to +93°C]
Release Liner	40# SCK

#### Environmental

Shelf Life	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	10,000 @ 25°C
RoHs	2002/95/EC Compliant
REACH	1907/2006/EC Compliant
ESD – HBM / CDM	> 5.0kV / > 1.5kV

#### RFID

Protocols Supported	ISO/IEC 18000-6C EPCglobal Class 1 Gen 2
Integrated Circuit	Alien Higgs-3
EPCglobal Certificate	950110126000001084
Operating Frequency	840–960 MHz
EPC Size	96 - 480 Bits
User Memory	512 Bits
TID	32 Bits
Unique TID	64 Bits
Access Password	32 Bits
Kill Password	32 Bits

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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, 7554451, 7553441, 7542901, 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, 6623579, 6606247, 6606079, 6590346, 6586338, 6566744, 6555408, 6527964, 6479395, 6468638, 6420266, 6316278, 6291896, 6281038. Other patents pending.

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