

**United States Department of Defense
Suppliers' Passive RFID Information Guide**

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DoD Suppliers' Passive RFID Information Guide

I. Introduction

Background

The United States Department of Defense (DoD) is dedicated to becoming an early adopter of passive Radio Frequency Identification (RFID) technology. Passive RFID tags reflect and modulate a carrier signal received by an interrogator. Passive RFID requires strong RF signals from a reader/interrogator, and the RF signal strength returned from the tag is constrained to very low levels by the limited energy.

RFID is a truly transformational technology and will play a vital role in achieving the DoD vision for implementing knowledge-enabled logistic support to the warfighter through fully automated visibility and management of assets. Our goal is to employ mature and emerging supply chain technologies to optimize the supply chain – use of RFID as an integral part of a comprehensive suite of AIT technology will facilitate accurate, hands-free data capture in support of DoD business processes in an integrated end-to-end supply chain enterprise.

In order to achieve this goal, we will require cooperation and concerted efforts from many entities, including our suppliers and the diverse U.S. military community. The final policy, released in July 2004, requires passive RFID tagging at the case, pallet and the item packaging (unit pack) level for all new solicitations issued on or after October 1st, 2004 for delivery of materiel on or after January 1st, 2005, in accordance with the implementation plan, which may be downloaded from <http://www.dodrfid.org/supplierimplementationplan.htm>.

DoD has been actively delivering RFID related information and requirements to its supplier community. Throughout this effort, we have been drafting a DFAR clause to include RFID relevant information, held two supplier summits to discuss RFID concepts and concerns, and established open channels of communication with our vendor community.

This document serves as a summary of the Department of Defense's requirements and guidelines related to passive RFID implementation for our supplier community. This guide will be updated as necessary as the technology and supporting business processes evolve.

Benefits

The benefits associated with RFID technology are numerous for both the Department of Defense and our suppliers. The incorporation of passive RFID technology will allow the DoD to have hands-free data capture enabling the efficient recording of material transactions as well as gaining increased efficiencies within our supply chain by streamlining our supply chain, improving business functions, and better supporting global war-fighting requirements.

Typically, RFID benefits can be seen in the areas of inventory management and visibility, operational improvements, shrinkage, and asset tracking. Within each area, there are substantial

benefits for the DoD as well as our suppliers, including collaborative benefits. Highlighted benefits include:

Supplier Benefits:

- Improve planning
- Produce faster demand responses
- Reduce the Bull Whip Effect
- Streamline Business Processes
- Improve efficiency in the recall of defective items
- Increase your ability to make sure that your products are always on our shelves.
- Receive faster payments for your supplied goods.

DoD Benefits:

- Improve inventory management
- Improve labor productivity
- Eliminate duplicate orders
- Replace manual procedures
- Automate receipt and acceptance
- Improve inventory and shipment visibility and management
- Reduce shrinkage
- Enhance business processes within the DoD
- Improve asset tracking

We expect that each supplier will explore your own possible benefits, and determine the most cost effective way to incorporate RFID technology into your organization.

Upcoming Milestones

Major upcoming milestones include:

October 2004-

Publish an interim DFARS Rule for the application of passive RFID tags at point of origin (manufacturer/supplier) on items procured by DoD.

February 2005-

Conduct a final policy rollout RFID Industry Summit.

The Department of Defense is committed to supporting our suppliers throughout the integration process. We will keep the supplier community informed of upcoming milestones, as well as changes to our related policies.

II. Implementation

The DoD vision for RFID is to utilize RFID to facilitate accurate, hands free data capture in support of business processes in an integrated DoD supply chain enterprise as an integral part of a comprehensive suite of AIT technology. The key to future functionality of the unique item data in the DoD Supply Chain will be the ability to temporarily associate “conditional state” information about the item – whether for transportation, supply management, maintenance, distribution, or disposal. In order to accomplish this goal, and as the available technology matures, the DoD expects to fully embrace the use of EPC technology as well as approved EPC tag data constructs in a supporting DoD data environment. The efficiencies RFID creates are quickly being realized as a valuable component of the suite of Automatic Identification Technology (AIT) technologies. Active RFID has already improved the ability to track and trace materiel through the supply chain. Combining the passive RFID technology will create greater efficiencies and data accuracy. Leveraging RFID to the fullest extent possible will improve the ability to get the warfighter the right materiel, at the right place, at the right time, and in the right condition.

Our combined efforts by January 2005 will lay the foundation for improving supply chain efficiencies. The DoD is working with various industry associations to ensure that their suppliers’ implementation approach aligns with the requirements of the policy.

Definitions

For clarification, the following definitions apply to passive RFID technology and tags in support of the DoD requirement to mark/tag material shipments to DoD activities in accordance with the DoD RFID policy:

EPC Technology: Passive RFID technology (readers, tags, etc.) that is built to the most current published EPCglobal Class 0 and Class 1 specifications and that meets interoperability test requirements as prescribed by EPCglobal™. EPC Technology will include Ultra High Frequency Generation 2 (UHF Gen 2) when this specification is approved and published by EPCglobal™.

UID (Unique Identification) Unit Pack A MIL-STD-129 defined unit pack, specifically, the first tie, wrap, or container applied to a single item, or to a group of items, of a single stock number, preserved or unpreserved, which constitutes a complete or identifiable package.

Bulk Commodities: These items shall not be tagged in accordance with passive RFID tagging requirements. Bulk commodities are products carried or shipped in rail tank cars; tanker trucks; other bulk, wheeled conveyances; or pipelines.

Examples of bulk commodities are:

- Sand
- Gravel
- Bulk liquids (water, chemicals, or petroleum products)
- Ready-mix concrete or similar construction materials
- Coal or combustibles such as firewood

- Agricultural products – seeds, grains, animal feeds, and the like

In addition, Munitions and explosives shall not be tagged until the following certification requirements are met for the passive RFID tag: electromagnetic effects on the environment (E3), Hazards of Electromagnetic Radiation to Ordnance (HERO), Hazards of Electromagnetic Radiation to Fuel (HERF), and Hazards of Electromagnetic Radiation to Personnel (HERP).

Case: Either an exterior container within a palletized unit load or an individual shipping container.

Exterior Container: A MIL-STD-129 defined container, bundle, or assembly that is sufficient by reason of material, design, and construction to protect unit packs and intermediate containers and their contents during shipment and storage. It can be a unit pack or a container with a combination of unit packs or intermediate containers. An exterior container may or may not be used as a shipping container.

Shipping Container: A MIL-STD-129 defined exterior container which meets carrier regulations and is of sufficient strength, by reason of material, design, and construction, to be shipped safely without further packing (e.g., wooden boxes or crates, fiber and metal drums, and corrugated and solid fiberboard boxes).

Palletized Unit Load: A MIL-STD-129 defined quantity of items, packed or unpacked, arranged on a pallet in a specified manner and secured, strapped, or fastened on the pallet so that the whole palletized load is handled as a single unit. A palletized or skidded load is not considered to be a shipping container.

Implementation Approach

Considering the volume of contracts and the variety of commodities managed, the DoD has developed a plan for passive RFID tagging that delivers best value to the warfighting customer. This implementation plan provides a roadmap that targets critical distribution functions within the defense distribution depots, depot maintenance operations and strategic aerial ports.

RFID technology will be implemented through a phased approach, applied both to supplier requirements and DoD sites. Shipments of goods and materials will be phased in by procurement methods, classes/commodities, location and layers of packaging for passive RFID.

For DoD suppliers, the following implementation approach will be followed:

Commencing January 1st, 2005

RFID tagging will be required for all DoD manufacturers and suppliers who have new contracts issued on or after October 1st, 2004 according to the following implementation guidelines:

The following Classes of Supply will require RFID tags to be placed on all individual cases, all cases packaged within palletized unit loads, and all palletized unit loads:

- Class I Subclass – Packaged Operational Rations
- Class II – Clothing, Individual Equipment, and Tools.
- Class VI – Personal Demand Items
- Class IX – Weapon Systems Repair Parts & Components

When these commodities are being shipped to the following locations:

- Defense Distribution Depot, Susquehanna, PA (DDSP)
- Defense Distribution Depot, San Joaquin, CA (DDJC)

Commencing January 1st, 2006

In addition to the requirements above, RFID tagging will be required for all DoD manufacturers and suppliers who have new contracts issued on or after October 1st, 2004 according to the following implementation guidelines:

The following Classes of Supply will require RFID tags to be placed on all individual cases, all cases packaged within palletized unit loads, and all palletized unit loads (pending appropriate safety certification):

- Class I – Subsistence and Comfort Items
- Class III – Packaged Petroleum, Lubricants, Oils, Preservatives, Chemicals & Additives
- Class IV – Construction & Barrier Equipment
- Class V – Ammunition of all types
- Class VII – Major End Items
- Class VIII – Pharmaceuticals and Medical Materials

When these commodities are shipped to DDSP, DDJC and the following:

USMC

Marine Corps Maintenance Depot, Albany, GA
Marine Corps Maintenance Depot, Barstow, CA

USA

Army Maintenance Depot, Anniston, AL
Army Maintenance Depot, Corpus Christi, TX
Army Maintenance Depot, Red River, TX
Army Maintenance Depot, Tobyhanna, PA

USTRANSCOM

Air Mobility Command Terminal, Charleston Air Force Base, Charleston, SC
Air Mobility Command Terminal, Dover Air Force Base, Dover, DE
Air Mobility Command Terminal, Naval Air Station Norfolk, Norfolk, VA
Air Mobility Command Terminal, Travis Air Force Base, Fairfield, CA

USAF

Air Logistics Center, Hill Air Force Base, Ogden, UT
Air Logistics Center, Tinker Air Force Base, Oklahoma City, OK
Air Logistics Center, Warner Robbins, GA

USN

Naval Aviation Depot, Cherry Point, NC
Naval Aviation Depot, Jacksonville, FL
Naval Aviation Depot North Island, San Diego, CA

DLA

Defense Distribution Depot, Albany, GA
Defense Distribution Depot, Anniston, AL
Defense Distribution Depot, Barstow, CA
Defense Distribution Depot, Cherry Point, NC
Defense Distribution Depot, Columbus, OH
Defense Distribution Depot, Corpus Christi, TX
Defense Distribution Depot, Hill Air Force Base, Ogden, UT
Defense Distribution Depot, Jacksonville, FL
Defense Distribution Depot, Tinker Air Force Base, Oklahoma City, OK
Defense Distribution Depot, Norfolk, VA
Defense Distribution Depot, Puget Sound, WA
Defense Distribution Depot, Red River, TX
Defense Distribution Depot, Richmond, VA
Defense Distribution Depot North Island, San Diego, CA
Defense Distribution Depot, Tobyhanna, PA
Defense Distribution Depot, Warner Robbins, GA

Commencing January 1st, 2007

RFID tagging will be required for all DoD manufacturers and suppliers who have new contracts issued after October 1st, 2004 according to the following implementation guidelines:

All classes of supply will require RFID tags on all individual cases, all cases packaged within palletized unit loads, all pallets, and all unit packs for unique identification (UID) items.

RFID tagging will be required on commodities shipped to any DoD location.

III. Guidelines and Requirements

The cost of implementing and operating RFID technology is considered a normal cost of business.

Per current DoD regulations, DoD Purchase Cards may be used to acquire items on existing government contracts as well as acquire items directly from suppliers that are not on a specific government contract. If the DoD Purchase Card is used to acquire items that are on a government contract that includes a requirement for RFID tagging of material per the appropriate DFARS Rule, any items purchased via the DoD Purchase Card shall be RFID tagged in accordance with

the policy. If DoD customers desire the inclusion of a passive RFID tag on shipments for these type purchases, this requirement must be specifically requested of the shipping supplier/vendor and the shipment must be accompanied by an appropriate Advanced Shipment Notification (ASN) containing the shipment information associated to the appropriate RFID tag.

The DoD will not endorse any technology or software provider. Suppliers should evaluate available technology and software.

Contract/Solicitation Requirements

All solicitations awarded on or after October 1st, 2004 for delivery of material on or after January 1st, 2005 will require that passive RFID tags be affixed at the case, pallet, and UID item packaging level for material delivered to the Department of Defense, in accordance with the implementation plan, which is located above under the section entitled: “*Implementation Approach.*” The plan can also be found at:

<http://www.dodrfid.org/supplierimplementationplan.htm>

Case and Pallet Tagging

Cases and pallets of material (except bulk commodities as defined in the Definitions section of this document) will be tagged at the point of origin (manufacturer/vendor) with passive RFID tags at the case and pallet level beginning on January 1, 2005. The RFID tag and data written to the tag must meet the published DoD standards.

Item Level (UID) Tagging

All items that require a Unique Identification (UID) will be tagged on the item packaging (UID Pack) at origin (manufacturer/vendor) with a passive RFID tag commencing January 1st, 2007.

Please note that this requirement for RFID tagging of UID items does not replace or affect the current process of assigning and placing unique identification on these items.

Tag Data

Transactions

To effectively utilize RFID events to generate transactions of record in DoD logistics systems, RFID tag data with the associated material information must be resident in the DoD data environment so that information systems can access this data at each RFID event (i.e., tag read).

The DoD will require commercial suppliers to provide standard Ship Notice/Manifest Transaction Set (856) transactions in accordance with the Federal Implementation Convention (IC) via approved electronic transmission methods (EDI, web-based, or user defined format) for all shipments in accordance with the applicable DFARS Rule via Wide Area Workflow (WAWF).

The transaction sets enable the sender to describe the contents and configuration of a shipment in various levels of detail and provide an ordered flexibility to convey information. The Federal IC 856 transaction set will be modified by the appropriate DoD controlling agencies to ensure the transactions can be used to list the contents for each piece of a shipment of goods as well as additional information relating to the shipment such as: order information, product description to include the item count in the shipment piece and item UID information, physical characteristics, type of packaging to include container nesting levels within the shipment, marking to include the shipment piece number and RFID tracking number, carrier information, and configuration of goods within the transportation equipment.

The DoD will also accept the submission of web-based ASN transactions as well as User-Defined-Format (UDF) ASN files. The following required ASN transactions will facilitate this use of RFID events.

RFID Event Type	RFID Tag Data Construct	ASN Required	ASN Type
Shipment from Supplier	SGTIN	Yes	856/WAWF Web or UDF
	GRAI	Yes	856/WAWF Web or UDF
	GIAI	Yes	856/WAWF Web or UDF
	SSCC	Yes	856/WAWF Web or UDF
	DoD Construct	Yes	856/WAWF Web or UDF

Technology

As outlined below, suppliers to DoD must apply one of the following categories of EPCglobal compliant passive UHF RFID tags. Because the goal of the DoD is to migrate from the current generation of Class 0 and Class 1 EPCglobal tags (version 1.0.1 and UHF generation 2) to the use of an open standard, 256-bit, UHF Gen 2 EPC, the following sunset dates apply.

Until the EPC UHF Gen 2 tag specification is published and quantities of UHF Gen 2 items are available for widespread use, the DoD will accept the following EPC tags:

- Class 0 64-bit read-only
- Class 1 64-bit read-write
- Class 0 96-bit read-only
- Class 1 96-bit read-write

The above listed tags will be utilized for shipments from suppliers in compliance with appropriate contractual requirements to tag items shipped to DoD receiving points commencing January 1, 2005.

Acceptable EPCglobal compliant passive UHF RFID tags and Sunset Dates

Class	User Memory Size (bits)	Sunset Date
0	64	At a minimum, 2 years from the publication of the specification for UHF Gen 2 – subject to the availability and product maturity of this technology, i.e., UHF Gen 2.
0	96	At a minimum, 2 years from the publication of the specification for UHF Gen 2 – subject to the availability and product maturity of this technology, i.e., UHF Gen 2.
1	64	At a minimum, 6 months from the general commercial availability and product maturity of Class 1 96 bit tags.
1	96	At a minimum, 2 years from the publication of the specification for UHF Gen 2 – subject to the availability and product maturity of this technology, i.e., UHF Gen 2.

Tag Data Constructs

As outlined below, suppliers to DoD must encode an approved RFID tag using one of two options:

- DoD tag data construct option
- EPCglobal draft tag data construct option

Suppliers that choose to employ the DoD tag construct will use the CAGE code previously assigned to them and encode the tags per the rules that follow. Suppliers that choose to use an EPC draft tag data construct will need to join EPCglobal and be assigned a unique EPC manager number that is used in encoding the tags per the rules that follow. The following table outlines the various combinations of RFID tags and encoding schemes that DoD will accept.

Passive UHF RFID Tag Specifications

Class	User Memory Size (bits)	Origin	Encoding	Tag Data Constructs
0	64	Supplier	EPC	Serialized Global Trade Item Number (SGTIN) Global Returnable Asset Identifier (GRAI) Global Individual Asset Identifier (GIAI) Serialized Shipment Container Code (SSCC)
0	64	Supplier	DoD	DoD Tag Construct
1	64	Supplier	EPC	Serialized Global Trade Item Number (SGTIN) Global Returnable Asset Identifier (GRAI) Global Individual Asset Identifier (GIAI) Serialized Shipment Container Code (SSCC)
1	64	Supplier	DoD	DoD Tag Construct
0	96	Supplier	EPC	Serialized Global Trade Item Number (SGTIN) Global Returnable Asset Identifier (GRAI) Global Individual Asset Identifier (GIAI) Serialized Shipment Container Code (SSCC)
0	96	Supplier	DoD	DoD Tag Construct
1	96	Supplier	EPC	Serialized Global Trade Item Number (SGTIN) Global Returnable Asset Identifier (GRAI) Global Individual Asset Identifier (GIAI) Serialized Shipment Container Code (SSCC)
1	96	Supplier	DoD	DoD Tag Construct

Passive UHF RFID Tag Data Structure Requirements:

**EPCglobal Draft Tag Data Construct Option:
EPCglobal members using any approved tag**

Tag Requirement	EPC Data Construct	When Used
UID Unit Pack	SGTIN	On item packaging for items meeting the DoD criteria for assignment of UID where a serial number is used to augment a GTIN which is used for the unique identification of trade items worldwide within the UCC.EAN System.
	GRAI	On item packaging for items meeting the DoD criteria for assignment of UID (reusable package or transport equipment of specific or certain value).
	GIAI	On item packaging for items meeting the DoD criteria for assignment of UID (used to uniquely identify an entity that is part of the fixed inventory of a company – GIAI can be used to identify any fixed asset of an organization).
Case, Transport Package, Palletized Unit Load	SGTIN	Items shipped as either pure case, or pallet (see above)
	SSCC	Items shipped as either pure or mixed case, pallet, (SSCC can be used by all parties in the supply chain as a reference number to the relevant information held in computer database or file).

Layout for 64 Bit EPCglobal Data Constructs

Tag Type	Header	Filter Value	Company Prefix	Item Reference	Serial Number
SGTIN	2	3	14	20	25
Tag Type	Header	Filter Value	Company Prefix	Asset Type	Serial Number
GRAI	8	3	14	20	19
Tag Type	Header	Filter Value	Company Prefix	Individual Asset Reference	
GIAI	8	3	14	39	
Tag Type	Header	Filter Value	Company Prefix	Serial Reference	
SSCC	8	3	14	39	

Layout for 96 Bit EPCglobal Data Constructs

Tag Type	Header	Filter Value	Partition	Company Prefix	Item Reference	Serial Number
SGTIN	8	3	3	20-40	24-4	38
Tag Type	Header	Filter Value	Partition	Company Prefix	Asset Type	Serial Number
GRAI	8	3	3	20-40	24-4	38
Tag Type	Header	Filter Value	Partition	Company Prefix	Individual Asset Reference	
GIAI	8	3	3	20-40	62-42	
Tag Type	Header	Filter Value	Partition	Company Prefix	Serial Reference	Unallocated
SSCC	8	3	3	20-40	37-17	25

DoD Tag Data Construct Option:
Non-EPCglobal members using any approved tag

Class 0 – 64 bit tags and Class 1 – 64 bit tags

Tag Requirement	Data Construct	When Used
UID Unit Pack	DoD Construct	On item packaging for items meeting the DoD criteria for assignment of UID
Case, Transport Package, Palletized Unit Load	DoD Construct	Items shipped as either pure or mixed case, pallet

DoD 64-Bit Data Construct – 64 bits total user memory on tag

Header	Filter	Commercial and Government Entity (CAGE)	Serial Number
8 bits	2 bits	30 bits	24 bits

Fields:

Header – specifies that the tag data is encoded as a DoD 64-bit tag construct, use binary number 1100 1110.

Filter – identifies a pallet, case, or UID item associated with tag, represented in binary number format using the following values:

- 00 = pallet
- 01 = case
- 10 = UID item
- 11 = reserved for future use

CAGE – identifies the supplier and ensures uniqueness of serial number across all suppliers - represented in ASCII format. (see section below on ‘Compression of Tag Data’ for details of encoding this field)

Serial Number – uniquely identifies up to $2^{24} = 16,777,216$ tagged items, represented in binary number format.

Sample binary encoding of a 64 bit Class 1 tag applied to a UID item shipped to DoD

Header (DoD construct)	1100 1110
Filter (Case)	01
CAGE (1D381)	11 0001 00 0100 11 0011 11 1000 11 0001
Serial Number (16,522,293)	1111 1100 0001 1100 0011 0101

Complete contents of the above encoded sample tag:

110011100111000100010011 001111100011000111111100000111000010101

Class 0 – 96 bit tags and Class 1 – 96 bit tags

Tag Requirement	Data Construct	When Used
UID Unit Pack	DoD Construct	On item packaging for items meeting the DoD criteria for assignment of UID
Case, Pallet	DoD Construct	Items shipped as either pure or mixed case, pallet

DoD 96-Bit Data Construct – 96 bits total user memory on tag

Header	Filter	DoD Activity Address Code/Commercial and Government Entity (DODAAC/CAGE)	Serial Number
8 bits	4 bits	48 bits	36 bits

Fields:

Header – specifies that the tag data is encoded as a DoD 96-bit tag construct, use binary number 1100 1111

Filter – identifies a pallet, case, or UID item associated with tag, represented in binary number format using the following values

- 0000 = pallet
- 0001 = case
- 0010 = UID item

➤ all other combinations = reserved for future use

DODAAC/CAGE – identifies the supplier and ensures uniqueness of serial number across all suppliers - represented in ASCII format.

Serial Number – uniquely identifies up to $2^{36} = 68,719,476,736$ tagged items, represented in binary number format.

Sample binary encoding of a 96 bit Class 1 tag applied to a case shipped to DoD

Header (DoD construct)	1100 1111
Filter (Case)	0001
DODAAC (ZA18D3)	0101 1010 0100 0001 0011 0001 0011 1000 0100 0100 0011 0011
Serial Number (12,345,678,901)	0010 1101 1111 1101 1100 0001 1100 0011 0101

Complete contents of the above encoded sample tag:

110011110001101101001000001001100010011100001000100001100110010110111111101 11000001110000110101

NOTES:

- 1. Specific tag orientation and location, as well as physical mounting requirements will be addressed in MIL-STD 129.**
- 2. Advance Ship Notices (ASNs) will be required as specified in contracts in accordance with the appropriate DFARS Rule/clause.**
- 3. It is the intent of the Department to incorporate all RFID tag formats and usage standards into a DoD RFID manual.**

Compression of Tag Data

In order to allow the use of Class 0 and Class 1 64-bit tags with the DoD Tag Data Construct, it is necessary to compress the size of the CAGE field using a simple algorithm involving the truncation of the two most significant bits of the standard 8bit ASCII representation of the characters of the CAGE. Once truncated, the remaining 6 bits can still uniquely identify the original ASCII characters and can be properly decoded after the encoding scheme.

The following table details this mapping scheme:

ASCII	Hex Value	Binary Value
A	01	00 0001
B	02	00 0010
C	03	00 0011
D	04	00 0100
E	05	00 0101
F	06	00 0110
G	07	00 0111
H	08	00 1000
J	0A	00 1010
K	0B	00 1011
L	0C	00 1100
M	0D	00 1101

ASCII	Hex Value	Binary Value
N	0E	00 1110
P	11	01 0001
Q	12	01 0010
R	13	01 0011
S	14	01 0100
T	15	01 0101
U	16	01 0110
V	17	01 0111
W	18	01 1000
X	19	01 1001
Y	1A	01 1010
Z	1B	01 1011

ASCII	Hex Value	Binary Value
0	30	11 0000
1	31	11 0001
2	32	11 0010
3	33	11 0011
4	34	11 0100
5	35	11 0101
6	36	11 0110
7	37	11 0111
8	38	11 1000
9	39	11 1001
SPACE	20	10 0000

All other mappings are invalid

Tag Placement

The transponder (RF tag) may be integrated with the shipping label (RFID-enabled labels), or may be an independent entity (where a separate shipping label would also be necessary).

All address labels and RF tags should be affixed at a suitable location where there is a minimum risk of damage and highest potential for successful interrogation.

The bottom edge of the address label containing the unit load information should be within the range of 81 cm to 122 cm (32 to 48 in) from the bottom of the pallet. If the loaded pallet is less than 51 cm (20 in) in height, the label should be placed as high as possible on the pallet, but not closer than 5 cm (2 in) to the natural top of the unit load.

Each unit load shall have one RF tag, independent or part of an address label, which contains the unit load information. Additionally, if the pallet is reusable, there may be a RF tag containing a unique returnable asset identifier.

RFID-enabled labels shall be applied to shipping containers or palletized unit loads as per the standards presented in MIL 129.

- The address label shall be placed on the identification-marked side and right of center on a vertical face, allowing a minimum of 5 cm (2 in) from all edges. An additional address label may be placed on the identification-marked end for styles which, because of their configuration, allow access by materials handling equipment only to the end of the container.
- The RFID-enabled label should not be placed over a seam nor should sealing tape or bands be placed over the label in a manner that interferes with the scanning of the label bar codes or reading the transponder data.

- The RFID-enabled label should not be placed in a manner that overlaps any other existing RF transponder. There should be at least a 10 cm (4 in) separation.
- The RFID-enabled label on a palletized unit load should not be attached to an exterior container if the cargo within the exterior container will not be removed for receipt processing and storage.

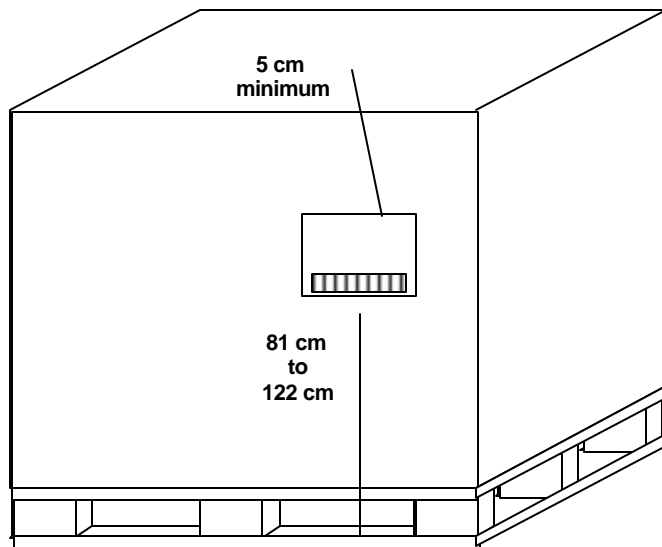


Figure 1 – Unit load (pallet) placement for RFID-enabled labels

If RFID-enabled address labels are not used, then attach a separate passive RFID tag and a separate address label(s).

- The passive RFID tag should be placed on the identification-marked side and right of center on a vertical face, allowing a minimum of 5 cm (2 in) from all edges.
- A passive RFID tag should not be placed in a manner that overlaps any other existing radio frequency (RF) transponder. There should be at least a 10 cm (4 in) separation.
- The passive RFID tag on a palletized unit load should not be attached to an exterior container if the cargo within the exterior container will not be removed for receipt processing and storage.

Performance Requirements

For reference, below are our minimum readability performance requirements:

RF tags are expected to meet the Department of Defense's user requirements for:

Portal: For the palletized unit load passive RFID tag, the passive RFID tags on the shipping containers and exterior containers within the palletized unit load, and the UID item unit pack passive RFID tags that are passing through a portal, the read distance shall be at least 3 meters (3.3 yards), reading passive RFID tags at 10 miles per hour (e.g., forklift).

Conveyor: For an individual shipping container passive RFID tag, an individual exterior container passive RFID tag, and the UID item pack passive RFID tag moving on a conveyor, the read distance shall be at least 1 meter (1.1 yards), reading passive RFID tags at 600 feet per minute.

RFID tags may either be permanent or temporary. It is up to the supplier to determine which tag type is best for your organization. Please keep in mind that both of these tag types have their own benefits and possible drawbacks. However, all tags must be durable (properly attached to item/case/pallet) and secure enough to make it through the DoD supply chain without jeopardizing usability.

IV. Commonly Asked Questions

What if my organization is not compliant by the January 2005 implementation date?

The DoD expects that all suppliers, in accordance with the supplier implementation plan, be compliant by the January 2005 implementation date.

Our focus will be on assisting our suppliers in compliance. In case of failed compliance, the DoD contracting officers will work with your organization to ensure compliance. Compliance is a requirement for obtaining a DoD contract and will be used for contract performance analysis.

Will barcodes still be required on case/cartons?

Yes, barcodes will still be required on cases and cartons. The requirements of human readable or linear/2D bar-coding are not altered by the RFID initiative.

RFID Notes:

Since technology is constantly evolving, we suggest that your organization purchase RFID hardware that is upgradeable and/or compliant with multiple RFID protocols.

Your organization's participation in the RFID industry growth will help us to better shape the RFID future. Along those lines, if you choose to join EPCglobal, your participation will allow us to better influence the proper use and adaptation of RFID technology and related processes.

V. Future Amendments

Future policy amendments may be needed, in order to keep up with evolving RFID standards, technology, and the business environments. DoD RFID policies and business rules will continue to be refined as passive RFID capabilities are implemented over the next few months.

Please check for updates to the Supplier Implementation Plan (<http://www.dodrfid.org/supplierimplementationplan.htm>) and this Supplier Passive RFID Information Guide (<http://www.dodrfid.org/supplierguide.htm>), for implementation dates and details as well as detailed information concerning the applicable commodities.

VII. Contacts

If you had yet to do so, we strongly encourage you, our supplier, to investigate RFID benefits and applications within your organization as soon as possible. Below are contacts that will help you in the effort.

- Visit EPCglobal on the internet: <http://www.epcglobalinc.org/>
- Create an RFID team/manager within your organization.

Additional information and RFID FAQs are available at <http://www.dodrfid.org>

Please note: This guide is subject to updates and information contained in this guide is subject to change. Please use <http://www.dodrfid.org> to keep abreast of the most current requirements