Adopting EPC/RFID Technology for the European Pallet Association

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Agenda

1. Introduction & vision
2. Presentation of the EPAL RFID System
3. Standardisation activities
4. Pallet tagging
5. Conclusion
• Open pool with more than **400 mio** wooden pallets in field

• **400 Production Partners** in more than 30 countries with an production of **70 Mio** pallets per year

• **1000 Repair Centers** with more than 28 Mio pallets repaired per year
Why RFID?
Each EPAL pallet can be uniquely identified

Pallet users will gain new possibilities within the Supply Chain Management

Pool user will gain a valuable tool to control flow and ownership of the pallets

Improves the control of production and repair process and will allow a clear authentication
EPAL RFID System

• The European Pallet Association (EPAL) started beginning of 2007 the project „EPAL RFID System“. Goal of the project is the full integration of the RFID technology into EPAL pallets.

• During the first project phase in 2008, a pilot has been realised showing the technical and practical realisation of such an integration.

• By August 2010 the GS1 Guideline pallet tagging has been approved.

• In the second phase the final processes, hardware and software components will be defined. Goal is to develop an integration plan for the roll-out.
Potential benefits

For EPAL pallet user
- Automated identification
- Possible quality check of each pallet
- Asset management
- Use of RFID in the complete supply chain

For the EPAL organisation
- Reduction of the administration through the automated invoicing process of the licencing fee
- Worldwide transparence of the EPAL licencee
- Secured high quality system for EPAL pallets
- Expected reduction of counterfitted pallets and identification of black markets
- Fulfillment of customer expectations
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Participants in the EPAL RFID System

- Manufacturer licencee
- Repaircenter licencee
- Sorter
- EPAL General Secretary
- National Committees
- Quality Control Company
- Distributor
- User

EPAL Information Network
The basics of the EPAL RFID System

- Each pallet will receive an individual number (serialisation)
- All relevant information (events) will be stored in the EPAL Information Network
- The events (who/what/where/when) will be generated by the licencees and handovered to the centralised EPAL Application
- The RFID Tag on the pallet does only consist of the unique serial number => the intelligence (events) is stored in the EPAL Information Network
- The events will generate different Pallet Status Informations (qualified / unqualified) – the users have access to this status information and can therefore check the quality of each pallet
Pallet Status Information

X = Not initialised
Q = Qualified
U = Unqualified
D = Destroyed

"X" => "Q"

"U" => "Q"  "Q" => "U"

"Q" => "U"

"Q" => "U"

"U" => "D"

Production

Repair

Exchange

Sorter

Recycling
Some major points needed to be solved

- **Which technology?**
  - aktiv / passiv / UHF / HF

- **Which standards?**
  - GS1 EPCglobal / DIN / ISO

- **Which data content?**
  - Data on Tag or Data on Network
  - Barcode as backup?

- **Amount of tags?**
  - 1,2,3 or 4 Tags

- **Which placement?**
  - Where should the tags be placed?

- **Tag mounting?**
  - Nailing, glueing, welding?
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In 2009, GS1 EPCglobal launched a working group to create a guideline called „Pallet Tagging“:
- Over 50 companies including manufacturers, retailers and service providers around the world have been working together on this guideline
- Co-authors coming from EPAL, CHEP, LRP, Korea Pallet Pool, SmartFlow Pooling
- The guideline has been officially approved by August 2010

The EPAL RFID Systeme is based on the globale GS1 Standards and the Guideline „Palett Tagging“
- EPC Electronic Product Code
- EPCIS EPC Information System
- GRAI 96 Global Returnable Asset Identifier
- GS1 128 Barcode
Key elements of the guideline

1. GRAI is the GS1 identification key to identify pallets.
2. GRAI data structure (GRAI 96 only) has to be used.
3. A minimum of 2 tags are sufficient – the exact placement of the tags still needs further definition and clarification at a later stage. Storage of the SSCC code in the user memory is optional.
4. Wooden pallets should have one RFID tag on the longer side and one RFID tag on the shorter side of the pallet.
5. Advisable and therefore optional that the GRAI is also made available in a barcode and/or a human readable form on the pallet.
Realisation of the guideline at EPAL

UHF, EPC Gen 2

120 x 17 x 2 mm

Middle cross board

Middle upper board
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Tag mounting

Challenges
• Wood as „living“ material
• High environmental stress
• Automated mounting process required

Evaluation
• Nailing: first experiences exist
• Glueing: a soft-tag with „organic“ glue
• Welding: in deep evaluation

⇒ Praticality not proven by now
Nailing

- Well known technology
- Longterm stability is not given
- Shortening the board in order to protect the RFID Tag
Glueing

- First test have been made with Softtags
  - Adhesion testing
  - Thermal cycling testing
    (-10 bis +85C for 49 days)
  - Ultraviolet exposure testing
    (100h / 3.2mW/cm2)
  - Humidity testing
    (85C / 85% for days)
  - Drop test (5m)
Wood welding

WoodWelding® technology is an innovative fixation technique that uses ultrasonic energy to form a bond in porous materials. To achieve this, thermoplastic elements in the form of e.g. a nail, dowel or seal are used as joining or connection elements. The technology offers a substitute to traditional fixation solutions such as nails, screws, adhesives etc.
Woodwelding

- superior adhesion, usually stronger than a screw of the same diameter (for dowels)
- short process time (a few seconds)
- immediate hardening
- the properties of the thermoplastics are comparable to those of wood, so expansion / contraction rates are similar for the joint and the wood
Requirements for the Tag mounting

- Environmental conditions
  - Thermal und climate (temperature, humidity, ultraviolat)
  - Mechanical – dynamical (shock, vibration)
  - Sealing IP67
- Wood as a living material (shrinking)
- Mounting process in an highly automated Industrie
  - 7.5 pallets per minute
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  - Passiv / UHF Gen 2

- **Which standards?**
  - GS1 EPCglobal / DIN / ISO
  - GS1 EPCglobal

- **Which data content?**
  - Data on Tag or Data on Network
    - Data on network
  - Barcode as backup?
    - Barcode GS1 128

- **Amount of tags?**
  - 1,2,3 oder 4 Tags
  - Min. 2 tags

- **Which placement?**
  - Where should the tags be placed?
  - One on the short side and one on the long side

- **Tag mounting?**
  - Nailing, glueing, welding?
  - Open
Conclusion

1. The adoption of RFID in the market has developed slower than expected. The focus lays in the management of returnable assets. The time of implementation is critical as the market needs to be ready to adopt.
2. The cooperation with GS1 assures that the EPAL RFID System remains compatible with other supply chain related RFID solutions.
3. The EPAL internal process have been defined and the realisation has been proven. The infrastructure at the licencees can only be defined after the final decision concerning the tags on the pallets.
4. The tag mounting process and technology remains undefined – good concepts exist but still require further investigation.