Protecting Recovered Items from a Disaster Site

using clean packaging technology

Intercept Technology Group
Intercept protects by sacrificially absorbing corrosive gases, including:

- Nitrous Oxides \((\text{NOx})\)
- Ozone \((\text{O}_3)\) - reactive oxygen
- Hydrogen Sulfide \((\text{H}_2\text{S})\) and Sulfur Dioxides \((\text{SO}_2)\)
- Carbonyl Sulfide \((\text{COS})\)
- Hydrogen Chloride \((\text{HCl})\)
- Acetic acid \((\text{CH}_3\text{COOH})\) and Formic acid \((\text{CH}_2\text{O}_2)\)

(from wood offgassing)
Protecting Recovered Items
Intercept Technology

VCI Protection

Actual Test Results by American Competitive Institute
Using ASTM B117 Salt Water Testing
Funded by Prospective Customer

Pink Poly Anti-Static

Aluminized Polyester
US Army TACOM  (Tank, Automotive & Munitions Command)  
EVALUATION OF INTERCEPT BARRIER MATERIAL FOR MILITARY PACKAGING  

**SALT-FOG Test Data Comparison**

<table>
<thead>
<tr>
<th>Metal coupon</th>
<th>Intercept Poly</th>
<th>VCI Poly</th>
<th>MIL-PRF-131 Foil / Poly</th>
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<tr>
<td></td>
<td>4-mil</td>
<td>4-mil</td>
<td>5-mil</td>
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<tr>
<td>Steel</td>
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<tr>
<td>Zinc</td>
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<td>59</td>
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</table>
Corrosion Intercept film (far right) placed in an atmosphere containing chlorine performs significantly better than other packaging films (foil, blue poly, volatile corrosion inhibitor).
Intercept Products consist of special high surface area copper particles which are reacted into the polymer-matrix to create a new class of product with several protective functions:

- Neutralization of corrosive gases present in the bag and migrating gases
- Protection as an “Anode“ for electro-chemical processes
- Natural function against Bio-Corrosion (copper is a passive mildewcide)
How Intercept Works

Corrosive Gas

Neutralized Corrosive Gas

Protected Metal Part

Corrosive Gas

Chemistry

Corrosion Intercept®
Stretch Film

Solutions

Presentation

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Intercept Benefits:

• Environmentally-friendly (no migration of particles and elements) when used as directed; reusable; no chemicals emitted, no VOCs; no VCIs, no shelf-life limit; recyclable as colored PE, decomposes in anaerobic landfill;

• RoHS, EU REACH, EPA, and TRGS-615 compliant;

• Only packaging system to win European environmental award;

• made with ISO certified suppliers;

• High effectiveness (from –35°C to +80°C) and 0-100% RH;

• Long durability (> 10 Years per mil of resin under average atmospheric conditions);

• Protects all ferrous & non-ferrous metals, electronics, optics, elastomerics, and plastics from atmospheric corrosion;

• Cost-savings – saves labor, material, time, rework, shipment cost
Additional Benefits

- Intercept allows passage of **RFID** signals, foils do not.
- **Anti-forgery**: Intercept packaging has a specific resistance $10^6$-$10^8$ ohm signature that can be verified by ohm meter.
- Intercept makes other packaging technologies more robust.
- Used Intercept packaging can be reused in the field for trans- and return shipments.
- Intercept packaging may better protect against **NBC attack** fallout because of anti-biological and corrosive gas neutralization.
- Intercept eliminates some factors that cause **shelf life** items to have short lives such as gas masks, NBC clothing, tires, gaskets, hoses. Intercept may allow taking S/L items off list.
Shrink Wrapping and Custom Covers

CT Scanner Quick Pack
Shroud and Base Sheet
5 Minute Pack Out
Approved for Export Shipping
Long-Term Storage: US Army TACOM designated 2500 up-armored truck cab crates be lined with Intercept to protect stored std cabs from corrosive gases released by wood.

Design won TACOM, Stewart & Stephenson, AIS top NIPHLE 2006 packaging award.
ROI calculated at 11-21 months. Intercept Fabric cover provides forklift and personnel access and eliminates outside cleaning.

Long-Term Storage: USMC Mobile Maintenance Facilities in accessible anti-corrosive storage.
AVLB Intercept Fabric Cover
anticorrosive, reusable, accessible, light & strong
Many companies spend time and material applying oils, greases, VCIs, Cosmoline or other protective coatings to protect the metal products while in storage or shipment.

Later coating removal adds labor and solvent burden, and hazwaste requirement to receiving unit.

Intercept eliminates the coating requirement and subsequent labor costs for application and cleanup.

No Oils, Sprays, VCI Paper or VCI Sponges Required with Intercept!
**Intercept Used by:**

- **US Military:** Army (TACOM), Navy, USAF, USMC; Coast Guard; MARAD
- **Allies:** Singapore, Germany, UK, Australia
- **Shipbuilders:** Conrad Industries
- **Automotive:** BMW, Ford, Chrysler, GM, Bosch, VW, Lemforder
- **Computers:** Analogic, Sky, Stratus, Cisco, 3Com
- **Museums:** Guggenheim, Getty, Smithsonian, National Gallery, etc
- **Mining, Oil, Gas:** BHP, Rio Tinto, KBR, Ausdrill, KBR
- **Electronics:** Alcatel-Lucent, Raytheon, Intel, Teradyne
- **Aerospace:** Boeing, Northrop, SpaceX, Rolls Royce, NASA, Thiokol, Aerojet, TRW, Hughes
“Intercept Technology...has been proven in laboratory tests to be better at protecting metals from corrosion than other similar corrosion protection methods such as volatile corrosion inhibitors (VCI). Additionally, Intercept Shrinkfilm is reusable, humidity independent; and safe for personnel and equipment.”

Frost & Sullivan
Oct 2007 Advances in Corrosion Prevention Report Executive Summary
In addition to acting as a barrier to external atmospheric gases the Corrosion Intercept film scavenges any corrosive gases that might be enclosed in the air space inside the package. Corrosion Intercept also acts as a sacrificial anode and prevents cathodic corrosion.
Intercept Stretch Wrap Benefits:

- Corrosion Intercept may be wrapped over irregular shapes – flip the film over to get the film to tack closed
- Corrosion Intercept additionally acts as a moisture vapor barrier-preventing moisture from entering the package
- Corrosion Intercept film may be adequate to hold the object on a pallet without additional packaging.
Spare Parts – Supply Chain Storage / Shipment

Requested Protection Period: 2 weeks to 2 years

Metals and Assemblies

Bags / Stretch / Shrink
Applications – Cast Iron Engine Blocks

Ford Motor Company (SA)

Engine blocks – 12 Month Storage test – No corrosion
1) Polyethylene bag

2) SI bag with Corex separator

3) Blocks head bank down on Corex strips

4) Cylinder blocks (6) with Desi Pak desiccant (4 sachets)
5) Perforated Corex sheet separating layers

6) Blocks head bank up making 2nd layer. Desiccants added as per # 4

7) Corex sheet on top

8) Close and tap SI bag
9) Close & tape plastic bag

10) Re-start the process on top layer separated by wooded sheet board

11) Complete double layer

12) Close bags as 8 & 9 - shrink wrap pallet
Improvements seen

Shipments to India and China changed to Intercept

Padding was used to prevent punctures
In addition to being able to pack without Oils – the packaging helps prevent counterfeiting
Applications – Ship Germany to Mexico

ZF Lemförder
Applications – BMW 15-Yr Storage

BMW AG
Application – Engine Manifolds
Shipped China to US

The use of Intercept bags has allowed these engine manifolds to be shipped from China to the US with no protective oil coating – no oil to be applied, no steam cleaning at receiving, no corrosion failures.
“after unpacking we found it to be in excellent condition…Proof that your system works well under all conditions” – United Group Project Coordinator

After 4 Years of Outside Storage
Total Cost Analysis

- **Faster** to install & allows reclosable access;
- Reduces packaging inventory & waste;
- **Safer** for personnel: no PPE required, no chemical vapors, no equipment reaction, less MSDS admin
- Eliminates component compatibility analysis – safe for all materials: rubber, optics, storage media, polycarbonate, metals
- Eliminates need for oils, sponges, VCI separator sheets, and coatings removal
Mandatory Use

- The only material consented by BMW for long term (15-year) storage – Most VCIs and Dry method storage are limited to under 3 years. Long-term data available
- Mandatory packaging suppliers of global mining companies BHP and Rio Tinto
- Mandatory packaging for Alcatel-Lucent for all 1\textsuperscript{st}, 2\textsuperscript{nd}, & 3\textsuperscript{rd} tier suppliers (Specification X-21386)
- Kellogg, Brown & Root for O&G project
Product Variety

Gusseted-Bags
Stretch and Shrinkfilm
Bags (With and without closing)
Flat-Film
MVTR- and EMI-Film
Injection Molded Products
Corrugated (up to 2.94)
CD-Protection
Nylon-Bags
Laminated Fabric for covers
Initial pricing on the product is competitive with other standard materials, the overall project cost has always come out lower! In detailed tests the following parameters were recorded:

1. Procurement
2. Cost of storage (shelf-life)
3. Handling (Time, secondary components, etc.)
4. Effective (recorded damage improvement)

Intercept always came out cheaper than the competition, with superior performance!
Service

The Intercept Technology Group (ITG) together with our partner companies around the world will develop, with our own engineering and design capacities, tailor-made solutions for your individual needs.

Technician and Application specialists are available in all regions (Americas, Africa, Asia, Australia, and Europe). Shipment trials are recorded and evaluated.

All Manufacturers are certified in accordance with DIN ISO EN 9001-9002, or have similar QC systems (Veritas, etc.).
Range of possibilities is nearly unlimited
Summary

Intercept Technology Packaging:

- Lower overall item cost;
- Improved equipment protection;
- Improved logistical flexibility;
- Shorter lead times;
- Increased supplier responsiveness;
- Improved environment;
- More satisfied users.
Intercept Technology – Simply Better Protection

Randy Dutton
CDR, SC, USNR-Retired
VP FPM Inc.

www.InterceptShrinkfilm.com

Sales: 800-222-4449 (Detroit)
Technical: 360-249-5833 PST