WILL IT READ?

Destructive Testing of Label & Nameplate Materials

BROUGHT TO YOU BY:
Horizons Imaging Systems Group
Welcome and thank you for joining us

Ready to destroy some labels?

Agenda

• Introductions
• Why Legibility Matters
• Test Materials (5)
• Accelerated Testing Methods (5)
• Destructive Testing Results
• Q & A
WHY DOES LABEL/NAMEPLATE LEGIBILITY MATTER?

1. Regulations
2. Operator Instructions
3. Brand Recognition
4. Computer Assisted Tracking

VS.
<table>
<thead>
<tr>
<th>Data Plates</th>
<th>Barcode Labels</th>
<th>Control Panel Faceplates</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Data Plate" /></td>
<td><img src="image2.png" alt="Barcode Labels" /></td>
<td><img src="image3.png" alt="Control Panel Faceplate" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Service/Process Schematics</th>
<th>Safety Diagrams/Signage</th>
<th>Nameplates</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image4.png" alt="Service/Process Schematic" /></td>
<td><img src="image5.png" alt="Safety Diagram" /></td>
<td><img src="image6.png" alt="Nameplate" /></td>
</tr>
<tr>
<td>CONDITION</td>
<td>ACCELERATED TEST</td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------</td>
<td></td>
</tr>
<tr>
<td>Heat</td>
<td>Oven @ 500°F for 1 hour</td>
<td></td>
</tr>
<tr>
<td>Abrasion</td>
<td><em>Tabor® @ 5,000 rotations on 1 KG wheel</em></td>
<td></td>
</tr>
<tr>
<td>Weather</td>
<td><em>Q-Sun® Weatherometer @ 1,000 hours</em></td>
<td></td>
</tr>
<tr>
<td>Chemical</td>
<td><em>Skydrol® Hydraulic Fluid @ 72 hours</em></td>
<td></td>
</tr>
<tr>
<td>Corrosion</td>
<td><em>Salt Spray @ 15 days</em></td>
<td></td>
</tr>
</tbody>
</table>

- Tests **Accelerated** Version of Real-Life Conditions
- **Healthy Gamut** of Conditions Evaluated (represents most operations and specifications)
- Allows the **Relative Comparison** (i.e. side-by-side) of Material Performance
NAMEPLATE & LABEL MATERIALS TO BE TESTED

Meet the contenders – Common Durable ID Material for Variable Data Nameplates/Labels

- Metalphoto®
- Laser Etched Black Anodized Aluminum
- Etched Stainless Steel
- Thermal Printed Plastic
- Laser Marked Acrylic
NAMEPLATE & LABEL MATERIALS (DETAIL VIEW)

Get up-close and personal

Metalphoto®

Etched Stainless Steel

Laser Etched Black Anodized Aluminum

Thermal Printed Plastic

Laser Marked Acrylic

WEBINAR SERIES

WILL IT READ?
MEASURING SUCCESS: WILL IT READ?
DESTRUCTIVE TESTING

How much abuse can these labels take?

TEST #1: HEAT RESISTANCE

All samples were heated in an oven to 500°F for 1 hour.
DESTRUCTIVE TEST RESULTS
Heat results; 500°F for 1 hour.

Metalphoto®
Etched Stainless Steel
Laser Etched Black Anodized Aluminum
Thermal Printed Plastic
DAMAGE

shrinkage

cracking

Laser Marked Acrylic
DAMAGE
DESTRUCTIVE TESTING

How much abuse can these labels take?

TEST #2: ABRASION RESISTANCE

All samples run through a Tabor Abraser @ interval of 1,000 rotations, then checked for readability and repeated up to 5,000 rotations total.
DESTRUCTIVE TEST RESULTS

Abrasion results; 5,000 cycles.

- Metalphoto®
- Etched Stainless Steel
- Laser Marked Acrylic
- Thermal Printed Plastic

- MARK DESTROYED
- POOR CONTRAST
- MARK REMOVED
- MARK DESTROYED

Laser Etched Black Anodized DAMAGE

WILL IT READ?

LABEL & NAMEPLATE WEBINAR SERIES
TEST #3: WEATHER RESISTANCE

All samples were exposed for 1,000 hours in the Q-Sun Xenon weathering test chamber.

Weather exposure cycle:
- 40 min light (0.60W/m²) @47°C (117°F) / 50% R.H.
- 40 min light (0.60W/m²) + water spray
- 40 min light (0.60W/m²) @47°C (117°F) / 50% R.H.
- 40 min dark + water spray @38°C (100°F) / 95% R.H.
DESTRUCTIVE TEST RESULTS
Sunlight & weather exposure; 1,000 hours.

Metalphoto®

Thermal Printed Plastic

Etched Stainless Steel

Laser Etched Black Anodized Aluminum

Laser Marked Acrylic DAMAGE

cracking
How much abuse can these labels take?

TEST #4: CHEMICAL RESISTANCE

All the samples were immersed for 72 hours in Skydrol®, a commonly used industrial hydraulic fluid.
DESTRUCTIVE TEST RESULTS

Skydrol exposure; 72 hours.

Metalphoto®

Thermal Printed Plastic

Etched Stainless Steel

Laser Etched Black Anodized Aluminum

swelling

fill ink destruction

Laser Marked Acrylic

FAILURE

WILL IT READ?
How much abuse can these labels take?

TEST #5: SALTWATER RESISTANCE

All samples were immersed in a saltwater fog for 15 days.
DESTRUCTIVE TEST RESULTS

Saltwater exposure; 15 days.

- Metalphoto®
- Etched Stainless Steel
  - DAMAGE
  - severe corrosion
- Laser Etched Black Anodized
  - FAILURE
- Thermal Printed Plastic
- Laser Marked Acrylic

corrosion
DESTRUCTIVE TESTING

CONCLUSIONS

What did we learn?

- **Laser Etched**: Black Anodized Aluminum
  - Results: Passed (4), Failed (1), Damaged (1)
  - Failed 1 of 5 Tests

- **Thermal Printed**: Plastic
  - Results: Passed (4), Failed (1), Damaged (1)
  - Failed 1 of 5 Tests

- **Etched Stainless**: Steel
  - Results: Passed (4), Failed (1), Damaged (2)
  - Failed 1 of 5 Tests

- **Laser Marked**: Acrylic
  - Results: Passed (3), Failed (2), Damaged (1)
  - Failed 2 of 5 Tests

- **Metalphoto®**: Stainless Steel
  - Results: Passed (5), Failed (0), Damaged (0)
  - Passed All 5 Tests
Metalphoto is a specialized type of anodized aluminum used to make nameplates, labels and control panels. *Generically referred to as Photosensitive Anodized Aluminum.*

Developed for the US Navy in 1958 and specified by most major OEMs, Metalphoto® is one of the most durable, high-resolution, variable information identification materials available.

Metalphoto gets its durability through its silver-based image which is sealed inside of the anodized aluminum and resistant to corrosion, sunlight/UV degradation, abrasion, high-temperatures and chemical exposure.

**Cross-section**

- **anodic layer**
  - the glass-clear, sapphire-hard anodized layer resists chemicals, paint, abrasion and dirt.

- **sealed image**
  - black graphics are metallic silver particles that hold up to extreme heat and sunlight exposure.

- **aluminum layer**
  - the rigid aluminum base will not peel, crack or delaminate.
• Are you using Metalphoto® today? … great.

• Are you using Metalphoto in some cases, but are there others where it could help in terms of the four pitfalls of illegibility (regulator compliance, operator compliance, brand recognition or computer tracking (barcodes))?

• Let us make you a custom label or nameplate for you to evaluate & test.

• To Learn more, request a sample pack at www.metalphoto.com.

Watch for Future LABEL & NAMEPLATE WEBINARS

- Pros & Pitfalls of On-Site Nameplate and Label Production (NEXT SCHEDULED WEBINAR)
- Do You Comply? Understanding Label & Nameplate Specifications & Certifications
- Adding Value to OEM Products with Item Unique Identification
- Cradle to Grave Traceability Through Barcode Labels
• For a custom sample, on-site facility assessment or additional information contact:

David M. Kesic  
Business Development Manager  
18531 South Miles Road  
Cleveland, Ohio 44128  
www.horizonsisg.com  
dkesic@horizonsisg.com

Horizons Incorporated  
ISG Imaging Systems Group  
metalphoto® Photosensitive Anodized Aluminum