

## Five Common Misconceptions: Metalphoto® vs. Etched Stainless Steel

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Etched and filled stainless steel underperforms Metalphoto® photosensitive anodized aluminum in select applications.



Salt spray test per ASTM B117

Etched and filled stainless steel has historically been used for nameplate, label and panel applications in harsh environments. Engineers have long defaulted to steel under the assumption that it will survive better than other materials. However, Metalphoto photosensitive anodized aluminum is actually superior to etched and filled stainless steel in many applications.

**There are five misconceptions often cited about Metalphoto's performance relative to stainless steel – this article explores and debunks each.**

- 1. Durability:** Etched steel is the most corrosion resistant label or nameplate material.
- 2. Legibility:** Etched steel plates support detailed, high-resolution graphics.
- 3. Compatibility:** Only steel labels and nameplates can be attached to steel surfaces without corroding.
- 4. Affordability:** Etched stainless steel is always the lowest cost option for durable metal nameplates, labels and panels.
- 5. Flexibility:** The easiest way to produce variable information nameplates is to individually engrave, punch or laser mark steel plates.

**Misconception 1:** Etched steel is the most corrosion resistant label or nameplate material.

**Truth:** The Metalphoto image is more resistant to corrosion than stainless steel in many environments.<sup>1</sup>

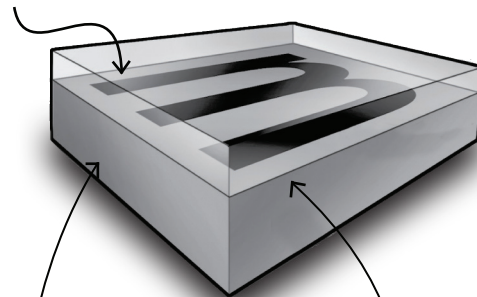
Stainless steel labels attached to aluminum or steel containers often show significantly more corrosion than Metalphoto labels attached to the same materials. A major transportation manufacturer of shipping containers saw this phenomenon several years ago and switched from stainless steel to Metalphoto.

The reason for this is Metalphoto's durability, which comes from its photographic image that is sealed inside anodized aluminum, offering the uncommon combination of high durability, image resolution and variable information capability. Metalphoto parts remain readable for more than 20 years, even after prolonged exposure to cleaners, salt spray, fuels, heat, humidity, sunlight and abrasion. The National Association of Graphic and Product Identification Manufacturers (GPI) Industry Standards and Practices Manual identifies Metalphoto photosensitive anodized aluminum as the most durable printed aluminum substrate available, citing its applicability for extreme environmental conditions and outdoor exposure.\*

**Metalphoto® Cross-Section**  
Durability through Design

**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 to extreme heat and sunlight exposure.

**Aluminum Layer**

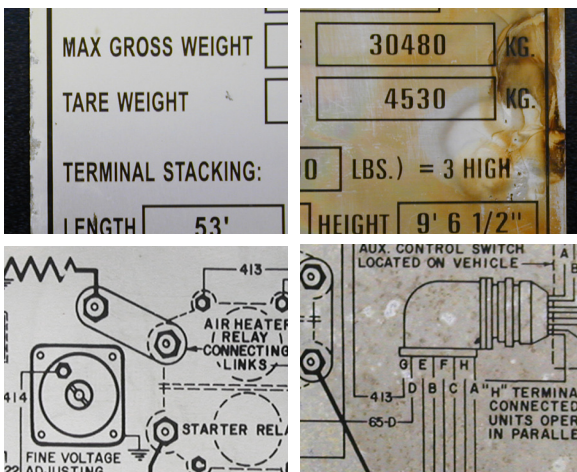
The rigid aluminum base will not peel, crack or delaminate.

**Metalphoto vs. Stainless Steel**  
24 Hours at 700° F

**Metalphoto vs. Stainless Steel**  
Saltwater Corrosion Tests<sup>2</sup>

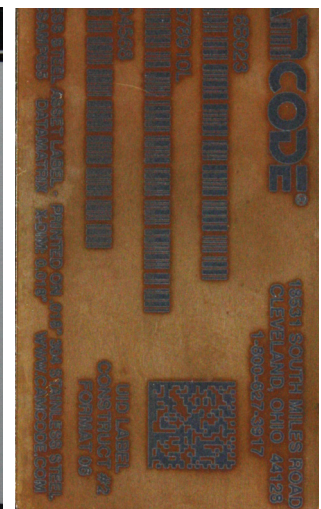
Metalphoto

Steel



Metalphoto

Steel



<sup>1</sup>One notable exception where steel would be preferable is extremely alkaline environments.

<sup>2</sup>Salt spray test per ASTM B117

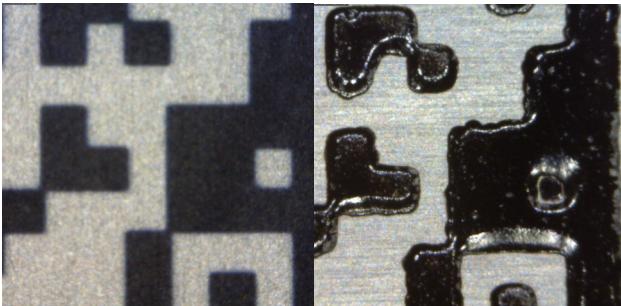
\*Horizons ISG does not warrant performance of its materials in any environment.

**Misconception 2: Etched steel plates support detailed, high-resolution graphics.**

**Truth: Metalphoto graphics are cleaner and higher resolution than etched stainless steel.**

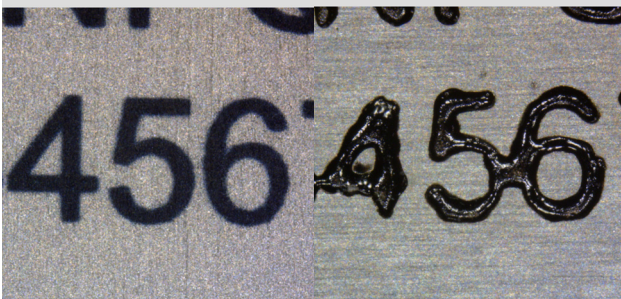
Metalphoto is a true, high-resolution photographic technology; unlike etched stainless steel, which is a material removal process. This affords ultra-high image resolution and contrast; making Metalphoto ideal for graphic tolerances other printing methods cannot accommodate. This is especially important for detailed schematics, wiring diagrams, maps, small labels with tight copy or small barcode/data matrix symbols.

#### **Metalphoto vs. etched steel 2D barcode @ 20x**



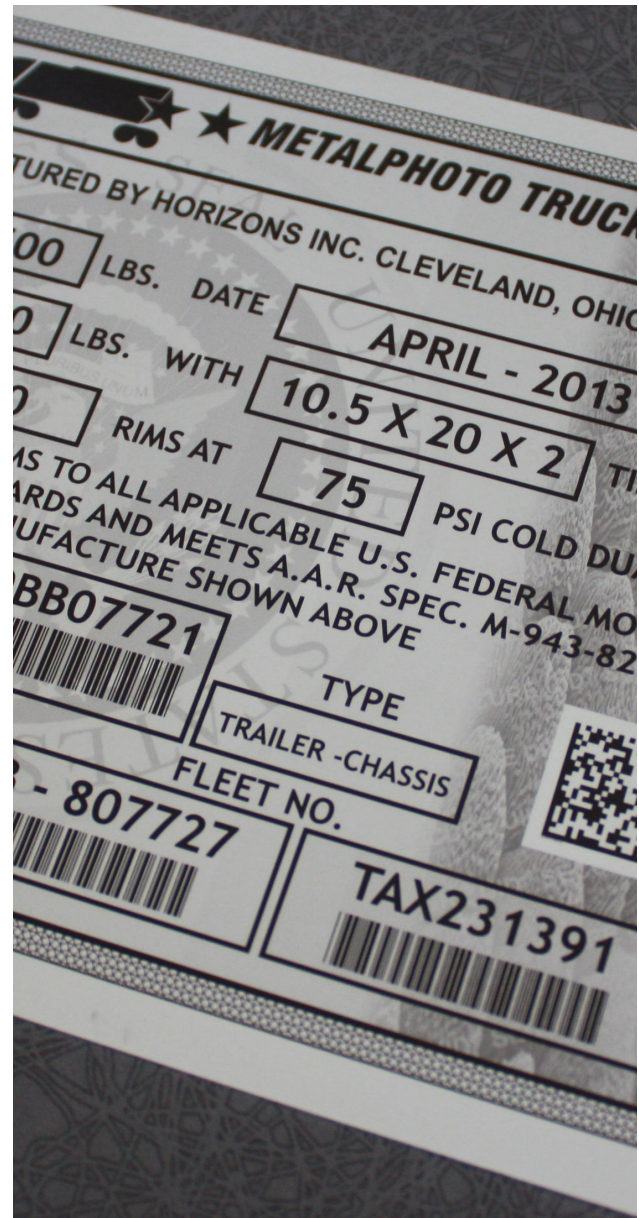
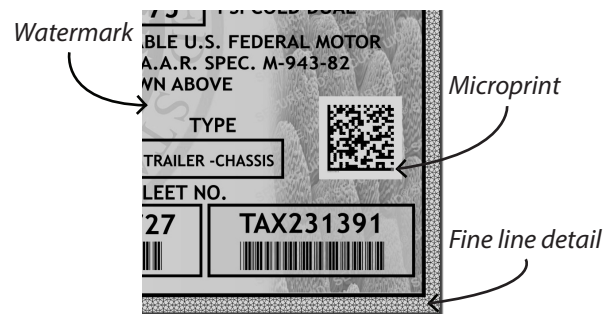
10MIL 2D barcode.

#### **Metalphoto vs. etched steel numbers @ 20x**



Etch and filled stainless steel is simply unable to consistently reproduce detailed linear and data matrix bar code symbols. As such, Metalphoto is ideal for high-detail, small labels on small surfaces such as guns, sight and communication equipment. Metalphoto also supports security printing features that make it a trusted deterrent for highly counterfeited products and assets.

#### **Close up view of Metalphoto anti-counterfeit capabilities.**



**Misconception 3:** Only steel labels and nameplates can be attached to steel surfaces without corroding.

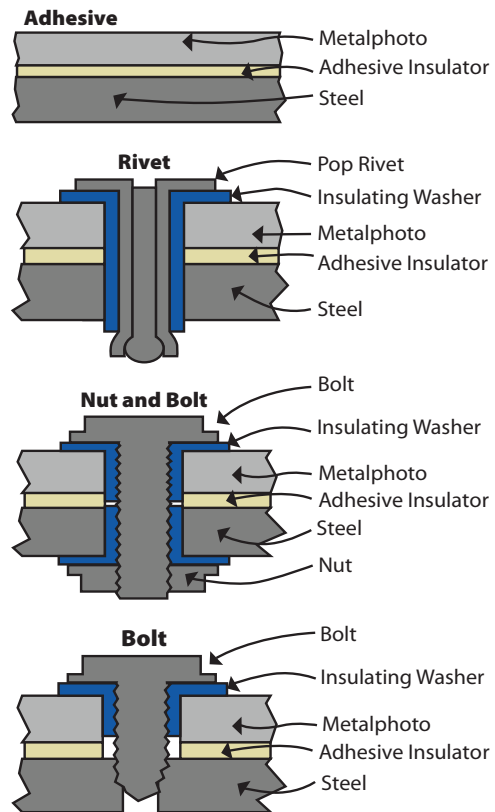
**Truth:** With proper attachment, Metalphoto provides very good corrosion resistance.

A common misconception is that attaching an aluminum label to a steel substrate will cause galvanic corrosion. With respect to corrosion resistance, studies by the Norwegian Marine Technology Research Institute (Marintek)<sup>1</sup>, the U.S. Navy<sup>2</sup>, and independent laboratories confirm that when coupled with proper attachment methods, Metalphoto provides no risk of corrosion when affixed to steel.

The Norwegian Marine Technology Research Institute (Marintek) found that Metalphoto plates showed “very good corrosion resistance” when properly attached to a steel plate and submerged in sea water.

Marintek found that a barrier layer of plastic or adhesive would be sufficient to minimize the effects of galvanic reaction. Likewise, when using mechanical fasteners, choose a fastener that is compatible with the attachment surface and fill the attachment holes with edge seal; alternately, separate the fastener with an insulating washer (see top right). For information download the [Metalphoto Attachment Guide](#).

### Proper Attachment Methods



<sup>1</sup> Marintek Report - Corrosion test of anodized aluminum name plates - Metalphoto

<sup>2</sup> Naval Surface Warfare Center, Corona Division - Label Material Environmental Survivability Test

**Misconception 4:** Etched stainless steel is always the lowest cost option for durable metal nameplates, labels and panels.

**Truth:** Metalphoto nameplates can cost 10 - 20% less than etched and filled stainless steel, especially for variable data and/or runs of fewer than 500 nameplates.<sup>1</sup>

Metalphoto requires minimal set-up which allows faster turn-around and fewer labor hours/part - making it ideal for unique, customized parts and/or short production runs.

The reason is that Metalphoto's imaging process is less labor intensive than etching and filling steel because it requires fewer steps.

Etching steel requires many steps, whereas Metalphoto only requires three steps: expose, develop, seal.

Moreover, at small volumes, steel's extra setup requirements add complexity to the manufacturing process, driving up costs at short run quantities.

Therefore Metalphoto can be imaged by a single operator – cutting both labor time and cost. The result is shorter lead times and lower cost nameplates.

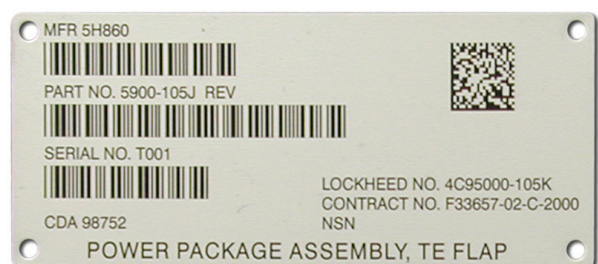


**Misconception 5:** The easiest way to produce variable information nameplates is to individually engrave, punch or laser mark steel plates.

**Truth:** Metalphoto can easily produce variable information tags tailored specifically to what is needed, without additional punching or engraving.

Metalphoto's ability to create hundreds, thousands, even millions of unique labels or nameplates is a function of its unique imaging process. Unlike etching and filing steel, where the many processing steps result in prohibitive costs for items containing unique information, Metalphoto's three step processing makes it economically feasible to process a high volume of unique data plates. The benefit of this process is that Metalphoto labels and nameplates can contain "item-unique" serialized data, one of a kind instructions and/or barcodes of any symbology. These durable barcodes can connect assets to computer systems, reduce data entry errors and enable asset tracking and management.

Additionally, Metalphoto is available with a variety of physical options that etched and filled steel cannot offer. Metalphoto is available in thicknesses ranging from 0.003" to 0.125", and in four different finishes: matte, satin silver, brushed and mirror-like gloss. Metalphoto is also compatible with an array of attachment methods (see pg. 4). All these customization options ensure that Metalphoto can meet the requirements of a wide range of applications, and that each Metalphoto part is tailor made for its specific application, perfectly meeting the demands of its intended use.



<sup>1</sup> Based on quotations from manufacturers of both etched steel and Metalphoto.

Photosensitive Anodized Aluminum (Metalphoto®) will perform on par or better with stainless steel over a wide range of applications with the proper attachment methods. Metalphoto has five key advantages over etched stainless steel: durability, legibility, compatibility, affordability and flexibility.

**Don't just take our word for it...**



**Seatrax** found stainless steel to have several limitations; namely high cost, long lead times and limited availability. Seatrax experienced the perfect storm of identification issues: extreme operating conditions and short lead times; all with customized graphics for each crane project. Seatrax found Metalphoto photosensitive anodized aluminum to have similar or better durability characteristics than stainless steel, with less cost and quicker turnaround times. According to Project Engineer Max Supkis, "Every single crane has unique sets of panels and having to wait and pay for the stainless is inconvenient and extremely expensive." The primary reason Seatrax specified Metalphoto is its durability – specifically its ability to survive sustained exposure to sunlight/UV, salt-spray, abrasion, hydraulic fluids and solvent cleaners.



A quotation from Page 14 of **U.S. Navy** Laboratory Evaluation of Label Plates and Attachment Methods sums up our story: "The surface appearance of the 304 and 316 stainless steel, and Monel 400 label plates would be a concern. As expected, the stainless steel showed evidence of surface rust staining, especially in the areas where engraving of the label plates was conducted, most likely due to the engraving tooling leaving behind surface particles of iron that rust upon exposure to atmospheric moisture." "All varieties of the Metalphoto® label plates were in excellent condition following all phases of exposure. There was no evidence of surface discoloration, pitting or fading."



Many truck trailer and container manufacturers, historically used etched and filled stainless steel for CSC Safety Approval Plates and VIN Data Plates. However, after years of abuse from road salt, impact abrasion and sunlight exposure, the etched plates can be difficult to read. Illegible nameplates can lead to replacement costs, inability to track trailer location and maintenance, safety hazards and, in some cases, regulatory fines.

Also, because etched plates are stamped with human-readable numbers, they can lead to human error and added labor cost. After a series of failures from damaged or illegible plates, **a leading trailer manufacturer** needed a VIN Data Plate solution that would both last the life of the trailer and support machine readable bar codes. Metalphoto was found to be the solution because it can incorporate variable data barcode labels into VIN Data Plates while providing better image durability and lower cost than etched steel.



Used for over 15 years on **Caterpillar**<sup>1</sup> (fmr. Bucyrus) mining equipment, Metalphoto is engineered to withstand the demanding conditions of surface and sub-surface mining. Metalphoto photosensitive anodized aluminum is approved for mining identification applications including approval plates (MSHA Title 30, Part 18.11), on-equipment schematics/diagrams (MSHA Title 30, Part 70.310), machine control panels and several other applications. Durable Metalphoto identification products support MSHA compliance, enable fast and proper equipment repairs and improve operator efficiency.

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