



info@wetetched.com

Wet Chemical Etching Process for

Stainless Steel Nameplates



This guide provides an overview of the [wet chemical etching process](#), specifically focusing on the production of [stainless steel](#) nameplates. The process involves several key steps, including cleaning, polishing, chemical immersion, film application, exposure, developing, and etching. By precisely controlling each stage, intricate designs are etched onto the metal surface with high precision. This method is widely used for producing detailed, high-quality metal components, offering advantages in both accuracy and cost-efficiency compared to other manufacturing techniques.

Shenzhen Xinxin Precision Equipment Co., Ltd

A510, No. 90, Xiyuan Road, Pingxi Community, Pingdi Street, Longgang District, Shenzhen,
Guangdong, China

Wet Chemical Etching Process for Stainless Steel Nameplates

In this section, we'll take you through the process of etching stainless steel nameplates using SUS304 stainless steel as our material example. This step-by-step guide highlights the various processes involved in wet chemical etching.

1. Cleaning and Polishing the Stainless Steel

The first step is to place the pre-cut SUS304 stainless steel sheet into the cleaning and polishing machine. This machine removes any surface dust and contaminants, ensuring a clean surface that is free from particles or oils that could interfere with subsequent processes. Polishing the material also helps to achieve the desired flatness and smoothness, which is crucial for precise etching



2. Chemical Immersion and Preparation for Film Coating

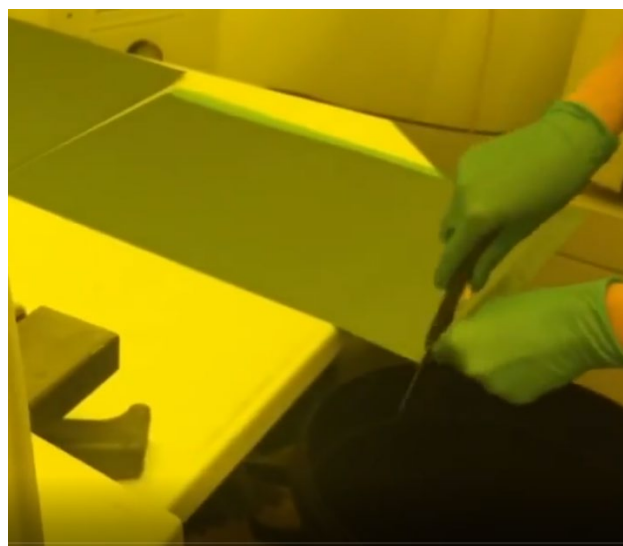
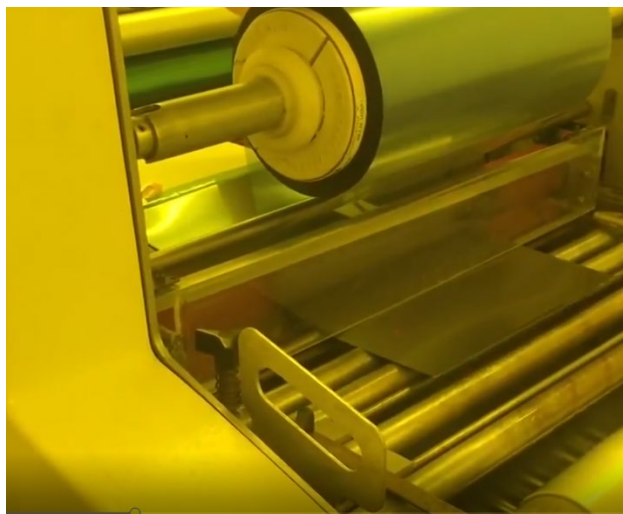
After cleaning, we handle the material with dust-free gloves to maintain a clean environment. The stainless steel is then immersed in a specially formulated chemical

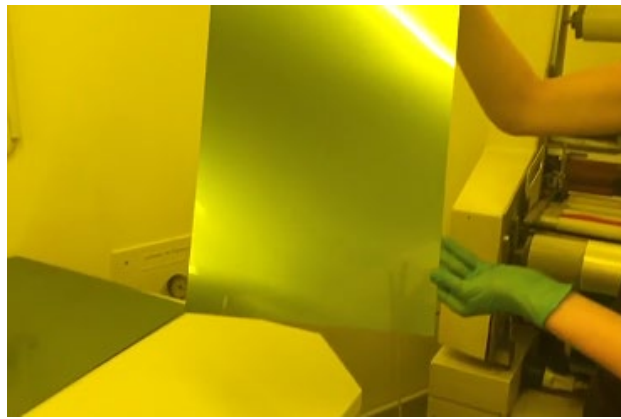
solution. This step ensures that the surface is prepared for the next stage, which is the application of the protective film. The chemical bath also serves to enhance adhesion for the coating to come



3. Applying and Trimming the Film

Next, we apply a protective film to the stainless steel sheet, covering its entire surface. Any excess film is carefully trimmed away to ensure it only covers the areas meant to be protected from etching. This protective layer will act as a resist, guarding certain parts of the stainless steel during the etching process. The precision in applying this film is key, as it determines the accuracy of the final etched pattern.





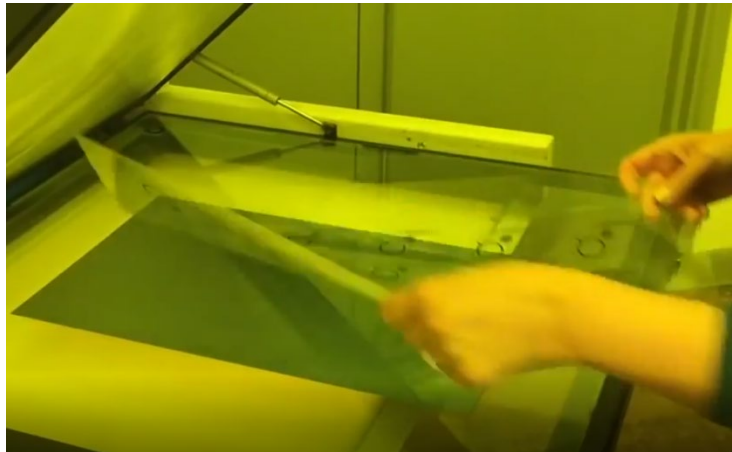
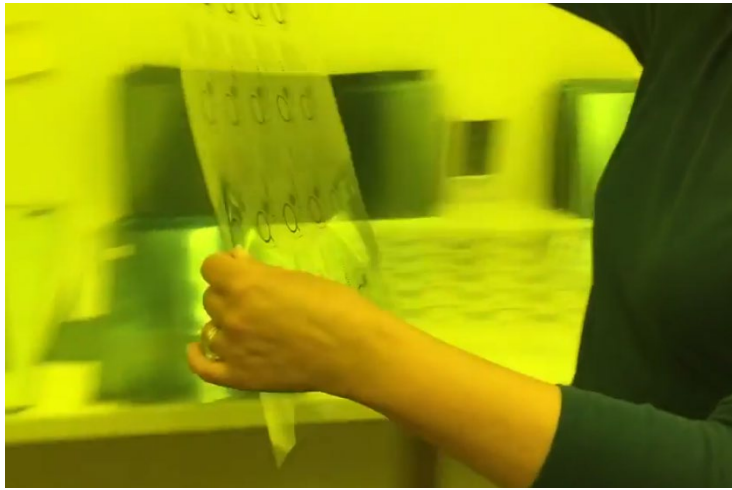
4. Exposure Process

Before exposure, the protective film undergoes a special surface treatment that enhances its ability to show fine etching details. We then align the stainless steel with the etched artwork or photomask (often referred to as a "film"). The engineer carefully checks the alignment of the artwork to ensure it matches the desired design perfectly before the exposure takes place. The exposure machine then transfers the design from the artwork onto the film.



5. Developing the Pattern

Once exposure is complete, the stainless steel is passed through the developing line. This step removes the portions of the film that were exposed to light, revealing the design on the stainless steel. At this stage, the etched lines and details begin to emerge, and the material is ready for the etching solution.



Engineers need to carefully check the symmetry of the etching drawing position



Exposure completed ✓



6. Etching Process

After development, the material is securely placed into a holding rack designed to prevent it from falling into the etching tank. The rack ensures the material is evenly submerged into the chemical etching solution. The exposed areas of the stainless steel are gradually dissolved by the chemical reaction, etching the desired pattern into the surface. This step requires precise timing and control over the chemical concentration to achieve the correct depth and definition



7. Film Stripping

After the etching process, a blue protective film still covers the surface of the etched stainless steel. We place the material into a mesh tray and run it through the stripping machine, which removes the blue film. Once the stripping process is complete, the etched design is fully exposed



After etching is completed, remove the etched product. At this time, we will find that there is still a layer of blue film on the surface of the product.



8. Rinsing and Drying

Following film stripping, the stainless steel undergoes a thorough rinsing to remove any residual chemicals from the etching and stripping processes. After rinsing, the material is dried to ensure no moisture remains, which could affect the final inspection or the product's surface quality



During this process, we will also go through a cleaning and drying process.

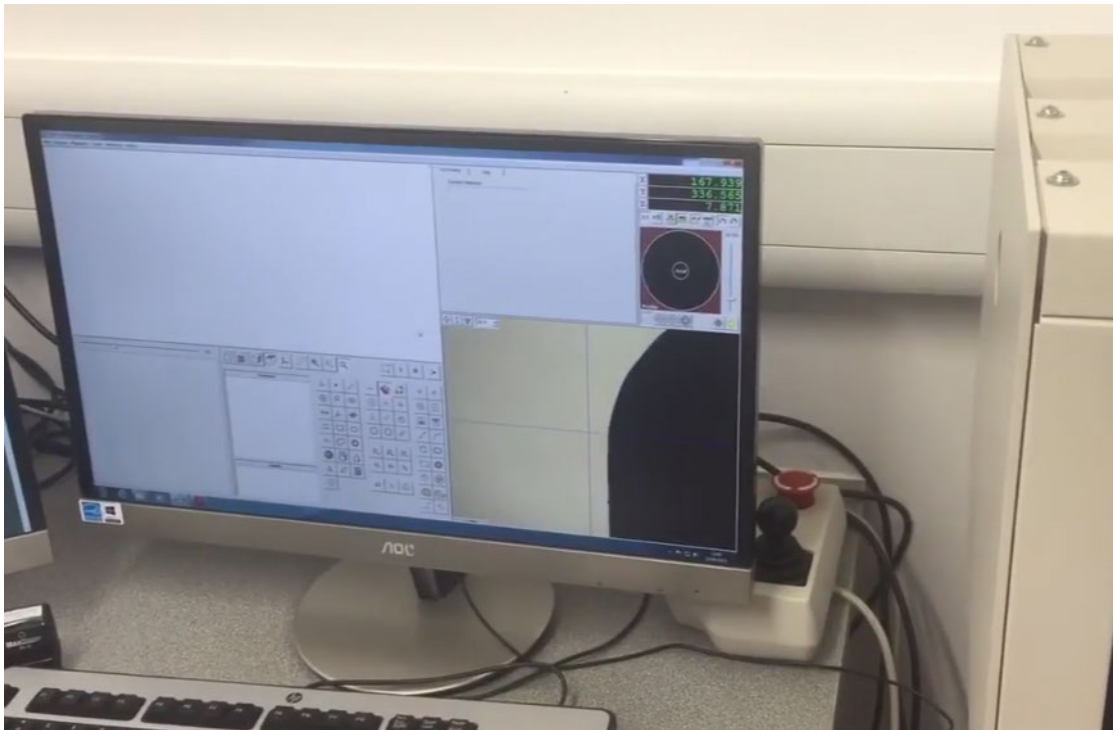
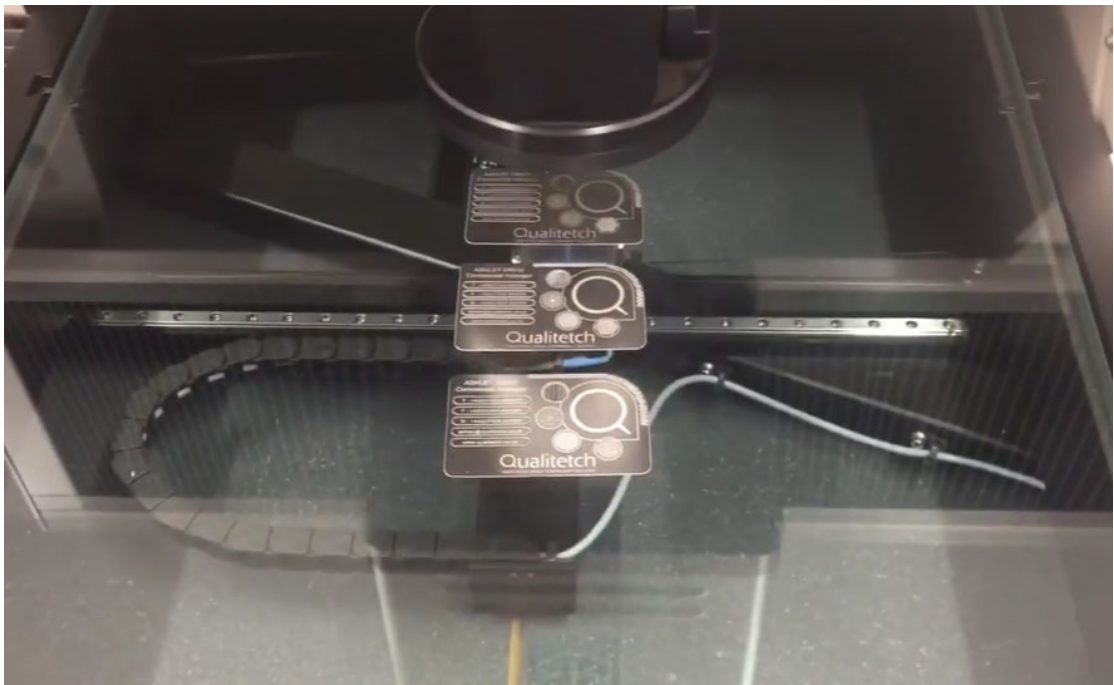


Open the storage panel and take out the product



9. Final Inspection and Packaging

In the final stage, the etched nameplates are carefully inspected for defects. The quality control process checks for precision in the etching depth, clarity of the design, and overall surface finish. Once the product passes inspection, it is ready for packaging and shipment



After the inspection is completed, the process is completed and the product is packed and shipped.

Thank you for looking!!

With a meticulous approach to precision chemical etching, we offer a unique solution for producing complex and detailed components. Our 50-meter etching line allows us to handle projects of varying scales while maintaining the highest level of accuracy.

Our etching accuracy is $\pm 0.003\text{mm}$



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