

High Performance Stainless Steel Stencils for Surface Mounting Technology (SMT)

ISSF Member

Manufacturer

Field

Location

Environment

Grade and surface

Competing materials

NIPPON STEEL Stainless Steel Corporation
 TAIYO YUDEN CHEMICAL TECHNOLOGY CO., LTD.
 Industrial machinery and equipment
 Japan
 industrial
 SUS304 H-SR2, NSSMC-NAR-301L SE1
 Copper Alloy, Nickel Alloy, Resin, SUS304 H-SR

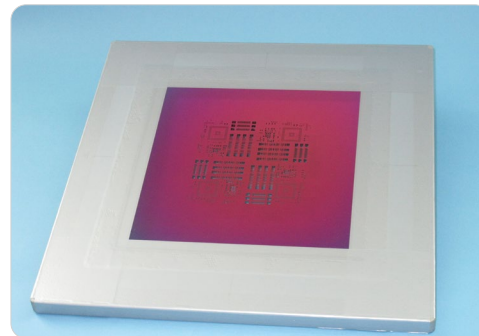
Advantage points of using stainless steel

- vs. Copper Alloy, Nickel Alloy, Resin
: Corrosion Resistance, High-strength, Durability, Reasonable Price etc.
- vs. SUS304 H : Stainless Steel Spring Sheet for General Usage
: Flatness, Low Residual Stress
- vs. SUS304 H-SR : Conventional Stainless Steel Spring Sheet for Precise Processing
: Fine Crystal Grain

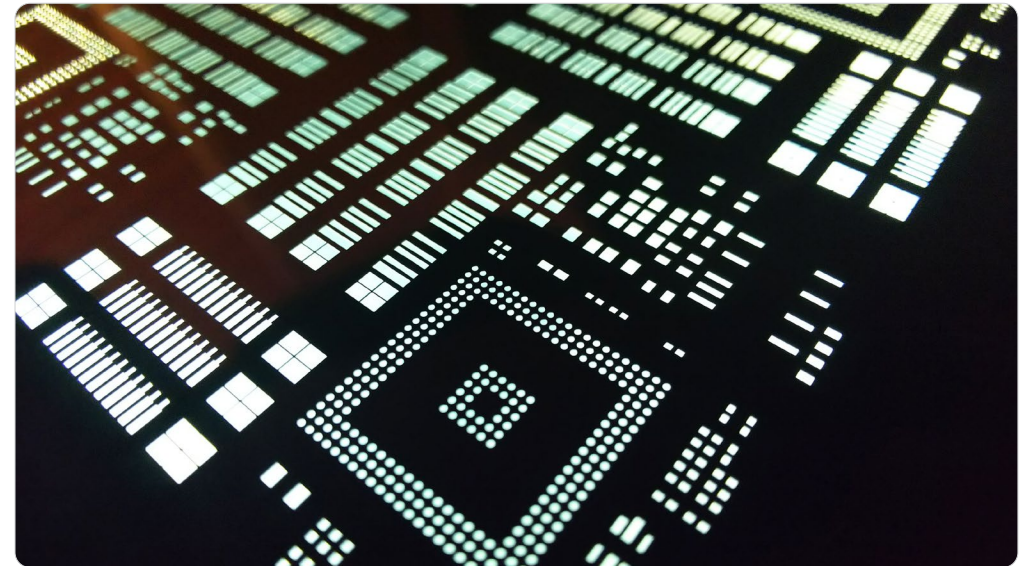
Product description

Background

In recent years, the performance and integration of electronic gadgets such as smartphones have been extremely advanced. And surface mounting electronic devices (SMD) have become small, and those circuit boards have been manufactured using advanced surface mounting technology (SMT). SMD are connected to the circuit board by solder printing technology using a SMT stencil. The performance and quality of the SMT stencil are important factors that determine the packaging density and connection reliability.



High Performance Stainless Steel Stencil for Surface Mounting Technology (SMT)
 Picture courtesy of NIPPON STEEL Stainless Steel Corporation

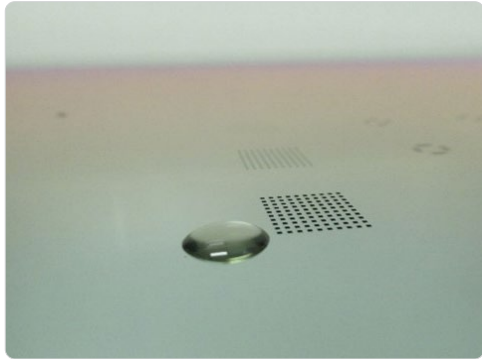


High Performance Stainless Steel Stencil for Surface Mounting Technology (SMT)
 Picture courtesy of NIPPON STEEL Stainless Steel Corporation

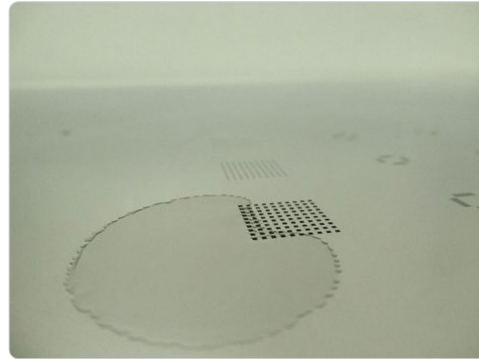
Overview of development

A stainless steel stencil is manufactured by making small holes in a stainless steel sheet of about 0.1 mm thickness using a laser cut and/or a chemical etching processing technique.

In this development, stainless steel sheet with fine crystal grains has been realized for stencils. By fine crystal grains, the surface of the holes formed in the stencil by laser or etching processing was smoothed and dimensional accuracy of those holes was improved. The smoothness of the processed wall surface improved the solder flow excellently.



Developed.
Picture courtesy of TAIYO YUDEN CHEMICAL TECHNOLOGY CO., LTD.



Conventional.
Picture courtesy of TAIYO YUDEN CHEMICAL TECHNOLOGY CO., LTD.

Furthermore, surface treatment technique for supplying hydrophobicity to SMT stencils was developed. The solder releasability was improved significantly by this treatment.

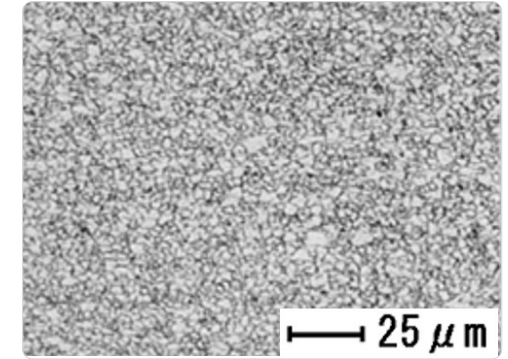
The solder printing quality and mass-production stability have improved by the developed high-performance stainless steel SMT stencil, M2 Coat, having the above-mentioned features.

Results of development

So far, it was not easy to mass-produce circuit boards mounting SMD smaller than fine 0402 chip (0.4 mm x 0.2 mm).

This developed high-performance stainless steel SMT stencil enabled stable solder printing with smaller SMD than 0402 chips, and has been used for high-density circuit board making process in Japan and overseas.

In the near future, high-performance metal stencil is expected to make a significant contribution to the automotive industry, where electronic control will further increase.



Fine Crystal Grain
Picture courtesy of NIPPON STEEL Stainless Steel Corporation