Meet Your Representative

NATIONAL ELECTRONIC ALLOYS INC.

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Tom is truly a specialist servicing the industry related to Stencil Materials and Applications. Tom represents NEA for this product exclusively in North America (USA, Canada, Mexico).

I don't think I have ever met anyone as knowledgeable about this entire product area as Tom. It certainly is a pleasure to have him as our representative selling stencil grade Invar and Stainless Steel for stencil applications.

Stencil Metals– Yesterday & Today

The Short History of the "Stencil"

The Surface Mount Stencil industry is still relatively new.

Since the components have no leads, there is no need to have drilled and plated thru holes in printed circuit boards. This is an obvious large cost savings.

Solder Joints that were formerly accomplished by spray fluxing and wave solder machines are now done using screen printable solder creams and set in ovens. The new process allows very densely populated printed circuit boards to be assembled much faster than the old thru hole designs, and with much higher reliability.

Quality of the Surface Mount Stencil is crucial to the entire process.

Over the last 16 years many changes have come about in the manufacturing of these stencils to allow the use of denser components with lead spacing that have gone from 50 mil pitch to 16 mil pitch.

In the late 1980's most surface mount boards were printed using equipment designed to produce hybrid circuits. They used stencils manufactured using stainless steel mesh and coated with emulsions to achieve proper thickness. This process was adequate for 50-mil pitch work, but the stencils did not last long due to the abrasive nature of the solder paste. The next generation of stencils came when brass sheet was etched with the print pattern and then bonded to a polyester mesh screen to allow the stencil to conform easier to printed circuit boards that are not flat.

Brass worked very well. It etches easy and can be very flat. It also

was found to have too short a life due to abrasion. While all of the above was taking place there was also a movement from polyurethane squeegee to metal squeegee. This was due to the relatively soft polyurethane squeegee scavenging paste from the stencil apertures. This left pads with insufficient paste. The metal squeegee, while fixing one problem, created another.

Early in the 1990's half hard stainless steels were being etched to replace the brass stencils. The stainless steel was much more abrasion resistant than brass, but did not etch as cleanly and did not have as good a paste release. This was solved by electro-polishing and nickel-plating after etching.

The first lasers were introduced to stencil manufacturing circa 1991.

From 1991 thru 1995 lasers were slowly being developed that could produce fine pitch stencils (31 mil pitch to 20 mil pitch) competitively with chemical etching. The laser systems of that time could produce up to 2000 apertures per hour. Today motion systems and software have been perfected, and laser stencil cutters can produce over 6000 apertures per hour. They are also capable of producing ultra fine pitch stencils with excellent edge quality.

Over the last 5 years the assembly of printed circuit boards has moved from original equipment manufacturers captive assembly shops to contract manufacturing companies. The contract manufacturers all practice JIT manufacturing techniques. This has forced stencil manufacturers into a fast turn mode. Lasers now dominate the manufacturing process because of this. As a result stencil materials now must have excellent abrasion resistance, be flat, have good paste release properties, and also work well with YAG lasers. Chemical etching however has not and will not go away.

It is still a very efficient method to manufacture stencils and is the only method to manufacture "step stencils" which are used in multiple print processes.

National Electronic Alloys and Four Points join forces.

In 1997 Dick Geoffrion of National Electronic Alloys (NEA) and Tom DeSisto of Four Points, Inc., met to discuss the needs of the SMT Stencil Industry for quality metal foil products. Since that time NEA has been developing products and inventory to service the ever-growing diversity of requirements that have emerged.

NEA now stocks material in New Jersey and California for its customers. Dual Certified 302/304Stainless Steel is stocked 24" wide in thickness from .002" through .030". Invar (NEA Alloy 36) is stocked from .004" through .015". These materials are available on 8" and 16" Cores, or can be sheeted to your size on NEA's Cut to Length Line.

Is "Invar" better?

Invar (NEA Alloy 36), a Controlled Expansion Alloy, is primarily used because of its Low Thermal Expansion Ratio. Comprised of 36% Nickel and a balance of Iron, Invar was designed over 100 years ago, to combat many of history's rapidly evolving technological problems. To put it simply, Invar is used for its low expansion variation over a wide range in temperature and extreme stability.

Proving true to its "Super Alloy" definition, Invar has proven the test of time and is still widely used today with more and more applications being added to its list of end uses. Some of its current applications include Electronic Components, Aircraft parts, Special Thermonic Devices, multiple Space Applications and now, The Stencil Industry.

Superior to other materials, our NEA Alloy 36 (Invar) is specially made for Stencil application with attention to flatness, uniformity and performance.

Invar is just one of the many Nickel Iron Alloys stocked by National Electronic Alloys. Late in 1998 NEA and Four Points recognized the need for a more user-friendly alloy when it came to laser cutting in the Stencil Industry. Invar has different properties that offer some advantages over Stainless Steel. Its higher nickel content gives it much improved paste release and as a result, no polishing or plating is required.

Stencil Grade Invar is softer than 304 Stainless Steel which makes the bending of rework stencils easier. Also the lower tensile strength makes Invar a better choice when making a "step stencil". It is much less likely to curl from uneven stress. Invar has also proven to be a superior material when producing very high-density stencils, since it has high heat resistance and a lower coefficient of linear expansion than 304Stainless Steel. Cutting speeds can also be increased when using Invar over 304 Stainless Steel.

Each Stencil application may be different from the next, and producing a quality stencil can be achieved with both Stainless and Invar.

Certain applications require more demanding characteristics than others. We have in stock materials that can give you that next step which is Invar.