CORROSION INTERCEPT

 Technical Bulletin 23 Intercept Case Studies A Review of Some Success Stories

Static and Corrosion Intercept were developed by Lucent Technologies Bell Labs to solve the diverse problems of Static Control and Corrosion or Tarnish prevention - two problems affecting optimum performance and life expectancy of electronics. What has been discovered since then, by a variety of companies from numerous industries, is that the Intercept Technology protects more than just electronics. Below find just a few of the success stories of the Intercept Technology; a truly revolutionary technology and family of products.

Corrosion Protection

Metals corrode by reaction with corrosive gases in the atmosphere. The most common, and most potent of these gases being Sulfur and Chlorine. These gases are present everywhere in our environment; Sulfur being produced from combusting fossil fuels (oil, gas, coal, etc.), from decaying vegetation, from ocean surfaces, from industrial manufacturing operations, from wetlands, from paper and paperboard (Sulfur is the paper crosslinking agent), etc. Studies measuring corrosive gas levels were done inside a major electronic cleanroom facility and even in their controlled environments significant levels of corrosive gases were detected. If the gases that cause corrosion are present everywhere, how can sensitive metals be protected.

Static and Corrosion Intercept were developed by Lucent Technologies Bell Labs to solve the diverse problems of Static Control and Corrosion or Tarnish prevention - two problems affecting optimum performance and life expectancy of electronics. What has been discovered since then, by a variety of companies from numerous industries, is that the Intercept Technology protects more than just electronics. Below find just a few of the success stories of the Intercept Technology; a truly revolutionary technology and family of products.

Corrosion Protection

Metals corrode by reaction with corrosive gases in the atmosphere. The most common, and most potent of these gases being Sulfur and Chlorine. These gases are present everywhere in our environment; Sulfur being produced from combusting fossil fuels (oil, gas, coal, etc.), from decaying vegetation, from ocean surfaces, from industrial manufacturing operations, from wetlands, from paper and paperboard (Sulfur is the paper crosslinking agent), etc. Studies measuring corrosive gas levels were done inside a major electronic cleanroom facility and even in their controlled environments significant levels of corrosive gases were detected. If the gases that cause corrosion are present everywhere, how can sensitive metals be protected.

The Intercept Technology uses a different and extremely effective, patented approach to protecting metal surfaces from corrosion. The basis of the Intercept Technology is that active corrosion sites have been reacted into the polymer matrix. Basically these active corrosion sites have created a torturous path for corrosive gases trying to migrate through the plastic material. This torturous path makes it statistically improbable that any gas can migrate through the plastic without contacting and reacting with one of these active corrosion sites. The protection afforded by the technology is 10 years of corrosion protection per mil of Intercept. To put this in perspective, a normal piece of Polyethylene would allow the same gases to penetrate through the bag within 24 hours.

The Royal Mint of England:

The Royal Mint of England was having problems protecting the Silver ingots used in producing medallions and commemorative coins. When Silver tarnishes the outer layer of Silver is being consumed. To remove the tarnish prior to the coining process, required in order to get a highly polished surface, the Silver would have to be cleaned, removing that outer layer of Silver. This is costly in terms of labor and also in lost Silver. By protecting the ingots in Intercept bags the Mint was able to eliminate the cleaning stage and still maintain their high quality product. The long life of the Intercept product allows them to re-use the bags increasing their savings.

The Guggenheim Museum of Art:

The Guggenheim Museum of Art, located in New York City was having problems protecting several sculptures going into storage, including a series of Copper and Bronze boxes. The problem was corrosion - atmospheric corrosion, as well as interactions between the metals themselves. They reviewed the Intercept Technology and determined using Intercept film wrapped around their sculptures was the best method to keep these valuable works of art free of the ravages of corrosion. Their first order has been followed up with others as they expand into their art collection in storage. Art work in storage accounts for at least 90% of all of the artwork in the world, so protecting art is a major market.

The three things affecting most artwork are, corrosive gases, bacteria, and Ozone. Intercept reacts with and neutralizes the corrosive gases. Intercept blocks out and reacts with Ozone. Intercept works equally well in a basic as an acidic environment - making it ideal for preserving books and papers which have levels of Sulfur. Lastly, Intercept has a backbone of Copper. Copper retards the reproduction of bacteria, allowing Intercept to act as a type of passive bactericide.

Selmer Ludwig - The Vincent Bach Company:

The Vincent Bach company is well known for its manufacturing of high quality professional and student brass instruments. We were called into their facility to help them solve their severe in process corrosion problem. Each one of their Saxophones, Trumpets and Trombones are cleaned at several stages through manufacturing. At the final stage the horns are cleaned then varnished. The problem is some parts are extremely delicate and continued cleaning can easily take the part out of tolerance.

CONSERVATION BY DESIGN LIMITED

Timecare Works • 5 Singer Way • Kempston • Bedford MK42 7AW • Tel: +44 (0)1234 853 555 Fax: +44 (0)1234 852 334
E-MAIL: info@conservation-by-design.co.uk • WEB SITE: http://www.conservation-by-design.co.uk

Four of the main reasons for their severe corrosion problems are:

(1) Use of high heat on the metal surface during soldering (heat accelerates corrosion).
(2) Use of the local gas supply for their soldering operation (the gas is high in Sulfur).
(3) Use of masking tape directly on surfaces needing protecting (paper backed masking tape contains high levels of Sulfur, both in the rubber based adhesive and the paper).
(4) Use of corrugated boxes to hold parts in (all paper corrugate contains Sulfur)

The solution was to concentrate on keeping the Sulfur away from the instruments. Changes could not be made easily or inexpensively to items 1 or 2 above, so concentration was placed on the later two. First, the amount of paper backed tape used was reduced, replacing it with plastic backed acrylic tapes for example. Then the storage or transport boxes were lined with cushioning material to hold the delicate saxophone keys. A flap that could be easily lifted was made to allow for the keys to be completing engulfed in the Intercept material. The final stage will be making shrouds for the storage racks that the instruments sit on waiting to be processed further. The results have been a dramatic reduction in the cleaning needed.

ESD Protection:

Protecting electronics requires that the material meet stringent requirements; including cleanliness, no detectable non-volatile residue, no detectable outgassing, ability to dissipate a charge and be permanently static dissipative while not being affected by time, temperature, solvents, humidity, or moisture. Only Intercept, with its unique patented technology can provide all of the above. Intercept also provides shielding from static electricity pulses which can be catastrophic to sensitive, non-hardened electronic components and assemblies.

Intercept combines these ESD properties with effective corrosion protection. Metals used in electronics are sensitive to corrosion. When metals corrode, they go from being conductive to being insulative. When micro-corrosion occurs in an electronic assembly, or on a chip, the effective conductive path is reduced. This reduction in the conductive path allows the remaining conductive metal to overheat and potentially burn through, looking like an ESD event, but in reality a corrosion event is what occurred. This mechanism is a significant contributor to latent or field defects in electronics. Only products made from the Intercept technology can protect against both static electricity and corrosion problems.

TRW Aerospace:
Companies manufacturing products for use in the military are required to keep spare parts in reserve for the entire length of the program or system, not just the project. Therefore long term protection and storage is critical for these companies.

Recently, TRW needed a replacement board for a system that they had built in the late 80's and discovered that the ESD protection for the boards had failed but equally, if not more deviating was that the entire supply of boards were corroded beyond use. TRW had to go into a special manufacturing run to produce replacement boards which they then put into Intercept plastic corrugate die cut holders and Static Intercept bags. With Intercept they will have permanent ESD protection as well as having 20 plus years of corrosion protection. They also required that the material be clean, non-outgassing and non-contaminating. Intercept has passed the rigors of NASA qualifications on all these points.

Raytheon:
Military supply companies generally take a long time to change packaging products, and they will normally only change to a military approved packaging system. The first group within Raytheon to take up the Intercept product had an initial presentation at the beginning of March. Their testing was completed by March 21 (test report available upon request) and they started ordering product in April. A turn around normally unheard of in military applications.

Initial orders were for bubble bags, bubble film, flat bags, thermoformed trays, and thermoformable sheeting. Secondary products include 8 mil film for conformable coating applications on boards and shrouds for covering and protecting machinery. All of this happened quickly and without benefit of Intercept having an official mil spec qualification. Raytheon found, through their testing, that Intercept was the first product that they had ever tested that met all of their requirements - non-corrosive, non-outgassing (extremely critical for sensitive components, LED and LCD, optics and boards), clean room compatible, permanently antistatic (Intercept being in the ideal ESD range of 10^6 to 10^8 Ohms/Sq), humidity independent, and non-contaminating. In addition to ESD concerns Raytheon was having a corrosion problem on some boards, so having a material that actively prevented corrosion was an added bonus. The use of Intercept at Raytheon has since expanded into other divisions.

Delco Electronics:
Delco Electronics was the first company, outside of Lucent to use the Intercept Technology. What Delco was most concerned about was that the material be permanently anti-static, non-corrosive, clean enough to be able to be used within a clean room environment. Tests on the Intercept product show that even without post cleaning Intercept is cleaner than clean room paper. Delco has used Intercept bags for over three years and has since specified Intercept products across the board - including plastic corrugate totes, formed totes, trays and bags.

ITT Aerospace Telecommunications:
ITT became aware of the Intercept Technology at an EOS/ESD symposium. They reviewed the technology and decided that the properties and advantages that Intercept offered were needed to better protect their products. They took samples and submitted them to NASA for approval and qualification. NASA tested the various Intercept products and has since put

Intercept on the approved list. Less than 6 months after seeing the material ITT specified that only Intercept packaging materials (flat, zipper and bubble bags) can be used in their facility.

Lucent Technologies:
Lucent developed and was the initial champions of this technology. All of the product configurations that Intercept exists in were developed to meet Lucent applications and needs. Lucent uses a variety of products; injection molded Intercept totes, thermoformed totes for assembly line use, thermoformed totes for inter-plant shipments, thermoformed trays, bags, shrouds, bubble material, plastic corrugate and film. The applications and uses of Intercept at Lucent are diverse and demanding. One part that is stored in an Intercept tray is an underwater repeater unit. The cost to replace a bad unit far outweighs the extra price of sure protection that Intercept provides. Other applications include shrouds for overseas and domestic shipments of switches and bags for boards and components. Lucent stands behind, uses and endorses the material that was developed to solve their ESD and Corrosion needs.

Others:
There are other companies and other unique applications for products made form the Intercept Technology. Some include film for conformable coating boards at Intel repair facilities, bubble wrap for international shipments of stainless steel computers (previously VCI's and desiccant had been used, but with the temperature extremes of air transport the cases were all arriving stained - Intercept, without desiccant, solved the problem), and numerous other companies in test or in early stages of ordering. The purpose was not to list all of our current applications or customers, many are left un-mentioned, but to show the material diversity.