

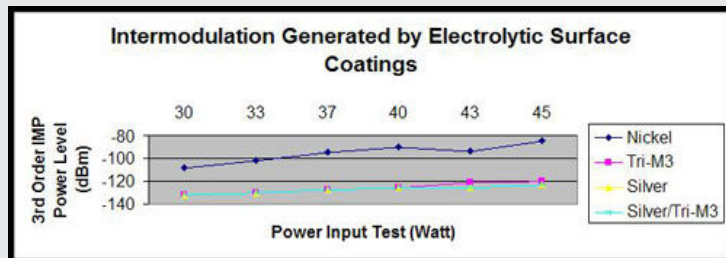


Guide to
Tri-M3™ plating

Introduction

Tri-M3™ is a tri-metal alloy coating with widespread applications in the electronics, hardware, and medical industries. Electro-Spec has developed tightly controlled, proven methods for applying this material with a very high degree of precision and consistency. For years, electronic component manufacturers have essentially had two plating choices: nickel, or silver. Both of these options have their strengths and weaknesses, but government pressure to eliminate nickel plating coupled with soaring silver costs have made both of these choices less palatable. Electro-Spec's high performance Tri-M3™ plating presents a superior substitute to nickel and silver plating in nearly all applications.

Tri-M3™ plating is nominally comprised of 55% copper, 30% tin, and 15% zinc. It provides an attractive bright white finish similar to bright nickel. Combining multiple metals provides a higher design freedom than single metal plating materials. Using multiple metals, a customized set of properties can be developed while eliminating many undesirable characteristics inherent in single metal plating options. Tri-M3™ is lead-free and has excellent leveling and solderability characteristics. Depending on the age of the deposit, Tri-M3™ can be soldered with or without flux. Even significantly aged parts can easily be soldered using standard Sn/Pb solder with an R or RMA type flux.



Abrasion resistance is an important aspect of any plating material. Tri-M3™ ranges from 500 to 600 on the Vickers Hardness Scale, which is more than twice as hard as silver and analogous to nickel. In laboratory testing, only 50 mg of material was removed per every 1,000 revolutions. This is a combined result of the lubricity and hardness exhibited by Tri-M3™. Only a very thin deposit layer, typically between 80 and 150 µin, is required to adequately protect the base metal, whereas nickel requires much higher plating thicknesses, on the order of 200 µin. Thinner plating thicknesses produce tighter tolerance finished parts with a higher degree of consistency.

Low intermodulation and electrical resistance make Tri-M3™ an ideal alternative to nickel in electronic components. Corrosion deposits, surface roughness, or in the case of nickel, magnetic properties, can cause intermodulation in high frequency applications. These undesirable signals create interference in today's advanced electronics. Tri-M3™ is nonmagnetic and has a low porosity, resulting in very low intermodulation. Thorough lab testing has confirmed that Tri-M3™ exhibits very favorable intermodulation characteristics in comparison to standard nickel plating. Additionally, Tri-M3™ has a much longer shelf life and is much more cost effective than silver.

Electro-Spec is a pioneer in Tri-M3™ plating applications for the medical industry.

High temperature resistance, and durability make Tri-M3™ an excellent choice for many medical instrumentation and equipment applications. It is essential that medical instruments be able to withstand sanitation at high temperatures without developing harmful corrosion. Tri-M3™ has shown superior corrosion resistance in salt spray, humidity, and caustic chemical laboratory testing. Using tightly controlled processes, Electro-Spec is able to apply Tri-M3™ with a very high level of precision and consistency.



A functional advantage of Tri-M3™ material is that it does not require a copper underplate. Many metals require a copper underplate for proper adhesion, but since the predominate metal in Tri-M3™ is copper, this step is eliminated. Tri-M3™ can be used as a standalone finish or as an underplate to silver or gold. As an underplate material, Tri-M3™ provides excellent adhesion and allows for very thin precious metal plating thicknesses to achieve the desired results. This can add up to significant cost savings.

Material Properties of Tri-M3:

- Diamagnetic
- Low Intermodulation
- Excellent Corrosion Resistance
- Low Electrical Resistance
- High Wear Resistance
- Low Porosity
- Exceptional Leveling Capability / Throwing Power
- Easily Solderable
- Lead (Pb) Free Deposit

Electro-Spec's Tri-M3 finish is RoHS and REACH compliant and in meeting all current or proposed regulatory metals compliance, is considered an environmentally "green" finish. Electro-Spec has refined the plating process and is able to provide consistent, high quality results using Tri-M3™ tri-metal alloy coating, contact them today to learn more.

