



Liberty Research Co.

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New Generation Extended Wear Pogo Pin Finish - **Super TAC**

If you use Burn in or Test sockets that have Pogo Pins, then you are probably acutely aware of the contact issues that have been exacerbated with the new Pb free solders.

Recently Liberty Research introduced a new plating finish material for its pin based sockets, using a Diamond like Carbon(DLC) dubbed **Super TAC**. Liberty Research has evaluated pins plated with Super TAC and find they provide better performance than Palladium/Cobalt or Hard Gold finished pins at about the same cost. Normally, a user can expect at least a more stable contact and a doubling in the number of insertions.

Liberty Research sees the Super TAC as the next generation of hard finish for connectors and sockets that are used in high volume testing of Pb free solder devices. This finish has been under development for several years. The work involved the development and refining the formulation and process for applying the vapor deposition tools.



Test show that the failure mode of pogo pins in burn-in and test environments is often a first order effect of the solder adhesion and fretting corrosion of the pin contact area. The goal of the Super TAC project was to develop a DLC finish that is harder and smoother than even Palladium/Cobalt or the hardest Gold finish. There are several variations of DLCs that are created at the nanoscale level of structure. The hardest, strongest and slickest is a formulation known as Tetrahedral Amorphous Carbon, or ta-C. For example a coating of only 2um thickness of TAC increases the resistance of common stainless steel against abrasive wear; changing its lifetime in such service from one week to 85 years. Super TAC film has an unique combination of properties such as high hardness, low friction, chemical inertness and negative electron affinity, making it a technologically important material. The ta-C contains up to 88% of SP3 bonds, so it has very high hardness (up to 75 GPa) compared to 6GPa for Palladium Cobalt, and extremely low frictional coefficient (0.08) compared to 0.6 for PdCo. This finish is widely use for reducing abrasion in drill bits, razor edges and inside high performance race engines. The coating thickness is 60nm and because it is amorphous, it is black in color. The coating will add .050 ohms to the contact resistance of the typical pin.