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DIRECT PRINTING ON AEROSPACE WIRE

Direct printing on aerospace wire is currently achieved by several established techniques, known as “hot stamp”, “ink jet”, “dot matrix” and “UV laser”. Hot stamping, the oldest method of wire identification, creates a mark on wire by pressing a hot typeface against wire via an appropriate foil. As a result, the image of the typeface is thermally transferred onto the wire insulation. Since it takes time to melt the ink, to prevent wire damage, dwell time and pressure have to be constantly monitored. Because the embossing head is a very hot mechanical device it is difficult to index individual typefaces and therefore automatically change printed information.

Industry’s desire to use thinner insulation wire prompted the US Navy as well as aircraft manufacturing companies to severely restrict usage of this technology only to non-essential wires.

Boeing Co., for example, in their specification BAC 5152 “IDENTIFICATION OF ELECTRIC WIRE AND WIRE BUNDLES” states:

“Do not use the hot stamp marking procedure on wire and cable unless the other direct methods do not make an acceptable mark” (see par.8.3.1.a.)

There are other methods to successfully mark the vast majority of wire and cable insulations. “Dot Matrix” and “Ink jet” wire marking systems, for example, became popular about 15 years ago and have offered a valid alternative to the hot stamp with their non-contact printing along with speed and total programmability. They have become dedicated word processors for printing on wire and cable. Their initial deficiency in mark durability was cured by Tri-Star’s plasma systems. These plasma systems allowed end users to durably mark exotic insulation material in full compliance to military and commercial requirements.

In the same Boeing’s specification (par.8.3.2) the ink jets that print air or thermally cured inks are listed as approved equipment for marking BMS13-11/13/35/40/48/51, M22759/34, and M81044/12. When thermal cure is used, one has to follow the requirements listed in TABLE XI (par.8.3.2.e.) that governs wire mark curing, depending on conductor’s coating.

Also, per the same specification the ink jets that print with UV cured ink jets are allowed to mark BMS13/12/48/51, M22759/34, M25038/1, M27500 with 08 or 23 jackets, and M81044/12.

For identification marks printed with ultraviolet curing inks, an appropriate model of the UV curing system is specified. As UV ink jet marking systems have offered a more durable mark and more efficient manufacturing cycle (as no post curing is required) they became popular within aircraft, airspace, automotive, and other industries.

Tri-Star’s M100J UV ink jet wire marking systems are in full compliance to Boeing BAC 5152 specification as well as all other pertinent military and other commercial requirements.

These systems successfully support the US Navy, Boeing, Martin/Lockheed, Continental Airlines, Cory, SAMS Electronic, and a number of other enterprises that process wire for the aircraft industry.

However, as an ink based surface printing method, this ink jet technology can't compete with the latest "golden child" of the wire processing industry, -a solid state UV laser. As ink jets mark wire with ink, it is reasonable to deduce that it is possible to remove it from the wire. UV Laser's marking method on the other hand is based on the absorption of the laser radiation on the surface of wire insulation that changes its color without any damage to the material, thus marking it with the most permanent marking method available.

These solid state lasers print wire at speeds close to 100 ft/min., meet MIL-W-5088 and Boeing BAC 5152 specification requirements, allow programmable printing of any messages of unlimited length, character size and message orientation. Some refer to them not as to wire markers, but rather as to highly computerized wire processors that automatically, measure, mark, cut, strip and coil wire.

They successfully mark any UV laser markable wires including, but not limited to TKT/TK wires such as BMS 13-60, M22759/80-92;ETFE, XL-ETFE, such as BMS 13-48, M22759/32, etc.

Unprecedented mark quality and durability, equipment reliability, low running cost, clean operation, and high productivity of the UV laser wire marking systems made them a preferred choice of numerous wire processing companies.

The M100L laser systems currently support the wire processing activities at various divisions of General Electric, General Dynamics, Gulfstream, US Air Force as well as at the numerous subcontractors to the Boeing Co. M100L laser wire markers also have been sold to Israel, Taiwan and China.