SAE INTERNATIONAL

AEROSPACE INFORMATION REPORT

AIR6894™ REV. A

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Superseding AIR6894

(R) Laser Wire Stripping Tools, General Understanding

RATIONALE

Revision required to update the document in line with the state-of-the-art in laser wire stripping and address editorial changes as needed.

INTRODUCTION

Laser wire stripping technology was developed under the sponsorship of NASA in 1977 to provide an alternative solution to mechanical wire stripping for use on wiring systems for the space shuttle. Laser wire stripping is a non-contact process which avoids the risk of nicking, scraping, or cutting the conductor strands, thereby improving process quality. Advantageously, in addition to stripping single core wires, laser stripping can also be applied to stripping the outer jackets of shielded cables whose cross section is highly non circular and not well suited to mechanical stripping methods. This SAE Aerospace Information Report (AIR) provides an introduction and overview to the state-of-the-art in laser wire stripping technology.

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1. SCOPE

This SAE Aerospace Information Report (AIR) describes laser wire stripping technologies and recommendations to strip electrical single conductor wires and shielded cables intended for aerospace applications. These recommendations include:

- Laser types for wire stripping
- Laser stripping system configuration
- Quality assurance
- Tool qualification
- Tool inspection
- User health and safety

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1.1 SAE Publications

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AS5768 Tool, Stripper, Electrical Insulation, General Specification for

2.2 Definitions

LASER: Laser is an acronym for light amplification by stimulated emission of radiation. Lasers are a source of intense monochromatic light in the ultraviolet, visible, or infrared region of the spectrum. The “active” or lasing medium may be a solid, liquid, or gas. The laser beam is generated by energizing the active medium using an external power source, which is most commonly electrical or optical.

CO_2 LASER: The carbon dioxide (CO_2) laser was one of the earliest gas lasers to be developed. The active laser medium is a gas mixture composed of carbon dioxide, nitrogen, hydrogen, and helium. The CO_2 laser produces a beam of infrared light with a wavelength of 10.6 µm.

CW LASER: Continuous wave (CW) lasers emit a steady beam of light with a constant power.

EXCIMER LASER: Excimer lasers are gas lasers emitting in the ultraviolet range. They use a combination of a noble gas (argon, krypton, or xenon) and a halogen gas (fluorine or chlorine) as the lasing medium and operate at discrete wavelengths in the range 126 to 351 nm.

Nd:YAG LASER: Nd:YAG lasers are one of the most common solid-state lasers. The lasing medium is an yttrium aluminum garnet (YAG) crystal doped with neodymium. Nd:YAG lasers are optically pumped using flashlamps or laser diodes. They emit light with a wavelength of 1.064 µm, in the near infrared spectrum.

PULSED LASER: Pulsed lasers emit light in a series of pulses of short duration at a given repetition rate with a given peak power.