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ASSOCIATION CONNECTING
ELECTRONICS INDUSTRIES®

Cleaning Methods and Contamination Assessment for Optical Assembly

Developed by the Photonic Component/Fiber Handling Task Group (5-25a) of the Optoelectronics Assembly Subcommittee (5-25) of IPC

Users of this publication are encouraged to participate in the development of future revisions.

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1 SCOPE

The scope of this specification is to describe the methods of inspecting and cleaning all optical interfaces so that their interconnectivity does not result in loss of optical signal. It also describes methods of contamination prevention.

The target audience for this standard are Manufacturing Operators, Manufacturing Process Engineers, Quality Engineers and Field System Installers.

1.1 Intent The intent of this standard is not to state a specific all inclusive process or procedure for cleaning optical connectors but rather to show several processes which are used in the industry and the advantages and disadvantages for each process. It will also provide an evaluation method for each process so that each reader may test or qualify each process to find out which one works best for their application. It is not the intent of this standard to advocate any specific products even though some product names may be referenced as a matter of usage in processes/procedures/testing discussed in each section.

1.2 Caution Reminders

1.2.1 Safety Cautions Operators shall ensure that there is no active laser light source generating a light signal through the fiber that is being cleaned or inspected. Remember many laser signals are invisible to the human eye.

It should also be noted to never look into a ferrule end-face while the system's laser is active. It is important to understand the equipment's operating procedures and warnings.

1.2.2 Electrostatic Discharge (ESD) Caution When working in an environment that couples optical fiber and electronic components the operator must adhere to all ESD prevention rules.

2 APPLICABLE DOCUMENTS

2.1 IPC-Association Connecting Electronics Industry

IPC-T-50 Terms and Definitions

IPC-0040 Optoelectronics Assembly and Packaging Technology

2.2 IEC-International Electrotechnical Commission

EC-60194 Terms and Definitions

2.3 TIA-Telecommunications Industry Association

TIA/EIA-604 (FOCIS) [13].

3 TERMS AND DEFINITIONS

Terms used in this standard are in accordance with IPC-T-50, IEC 60194, or IPC-0040. The following additional terms are also defined.

Adaptor The metal or plastic body that mates two connectors of same or different types.

Alignment Sleeve A circular collar that is usually mounted into a chassis connector intended to help align the connecting fibers as they are plugged into the chassis to complete an optical circuit.

Bit Error Rate (BER) See Bit Error Ratio.

Bit Error Ratio (BER) Used as the fundamental measure of the component's performance, and is defined as the following:

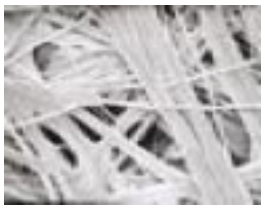
$$\mathrm{BER} = \frac{\mathrm{E(t)}}{\mathrm{N(t)}}$$

Where *BER* is the bit error ratio, *E (t)* is the number of bits received in error over time *t*, and *N (t)* is the total number of bits transmitted in time *t.*

Bit Error Rate Tester (BERT) Apparatus used to test for BER.

Cleaning Cassette Fabric

Woven Fabric



Entangled Fabric

Coaxial Illumination When an object is being viewed using light which strikes the surface along the line of sight. This is usually accomplished with a beam splitter. This type of lighting shows the differences in surface textures.

Colored Light The hue of a given wavelength.

DUT Device Under Test.

Detection The ability of an optical system to detect an object or defect of a particular size.

Eyepiece Lens The lens of a compound microscope that is nearest to the eye of the observer.