

Fiber Connector End-Face Inspection Requirements

This project is being organized to develop requirements for an industry-wide standard for cleanliness of fiber optic connectors. It builds on experimental data assembled by the Fiber Optic Signal Performance Project regarding the influence of contamination/scratches on optical signal performance, and will extend research efforts to include development of visual inspection criteria for polished connector, multimode fiber and receptacle-type connectors. The project will develop requirements for allowable surface defects, such as scratches, pits and contamination. Based on experimental data and the results of mathematical modeling, the team plans to define the zone criteria and pass/fail visual requirements for polished connectors, single mode fiber. They will also develop specifications for dust cap cleanliness, including requirements for the design and material of the dust cap and test methods.

Proposed areas of consideration:

1. Collaboration with IPC on standard IPC-8794-01
2. Finalize pass/rejection inspection criteria for collaboration with IEC (Sept. 2004 Warsaw meeting)
3. Receptacles
 - understanding different technologies for receptacles (fiber stub, lenses, contact lenses, non-contact lenses)
 - understanding critical parameters sensitive to contamination (back reflectance?, receive sensitivity?)
 - developing of techniques for powder application for receptacle devices
 - design of experiment for receptacle devices (experimental set-up, type of devices to be used, etc.)
 - cleaning techniques for receptacles
 - identify team members
4. Multimode fiber
 - same DOE as for single mode fiber with dust
 - scratch experiments?
 - mathematical modeling
5. Prevention of electrostatic charge effect (ESC) effect during cleaning process of connectors and receptacles
 - cleaning swabs
 - cleaning liquid evaluation in regards to ESC (HFE, IPA)
 - combination of dry and wet cleaning
6. Dust cap cleanliness
 - develop a specification for dust cap cleanliness including developing requirements for design and material
7. Elimination of sources of contamination in the manufacturing environment

Optional area of consideration:

1. The impact of IPA on signal performance

The NEMI team will collaborate with the International Electrotechnical Committee (IEC), Telecommunications Industry Association (TIA) and IPC. Specifications will be jointly submitted to IEC's Working Group 6 (interconnecting devices) for incorporation with IEC 61300-3-35, and to IPC as a subordinate standard to the existing IPC-0040 standard (Optoelectronic Assembly and Packaging Technology). In addition, the project will collaborate with TIA and IPC on the development of cleaning methods and contamination assessment for Level 1 and Level 2 optical assembly.