MAINTAINING CLEANLINESS OF HIGH DENSITY CONNECTORS

STICKLERS
When you need perfectly clean splices & connectors®

FIBER OPTIC CENTER

INDUSTRY STATS SNAPSHOT

HTI Martin Technical Research Survey of 89 network owners and network contactors study on network failure.

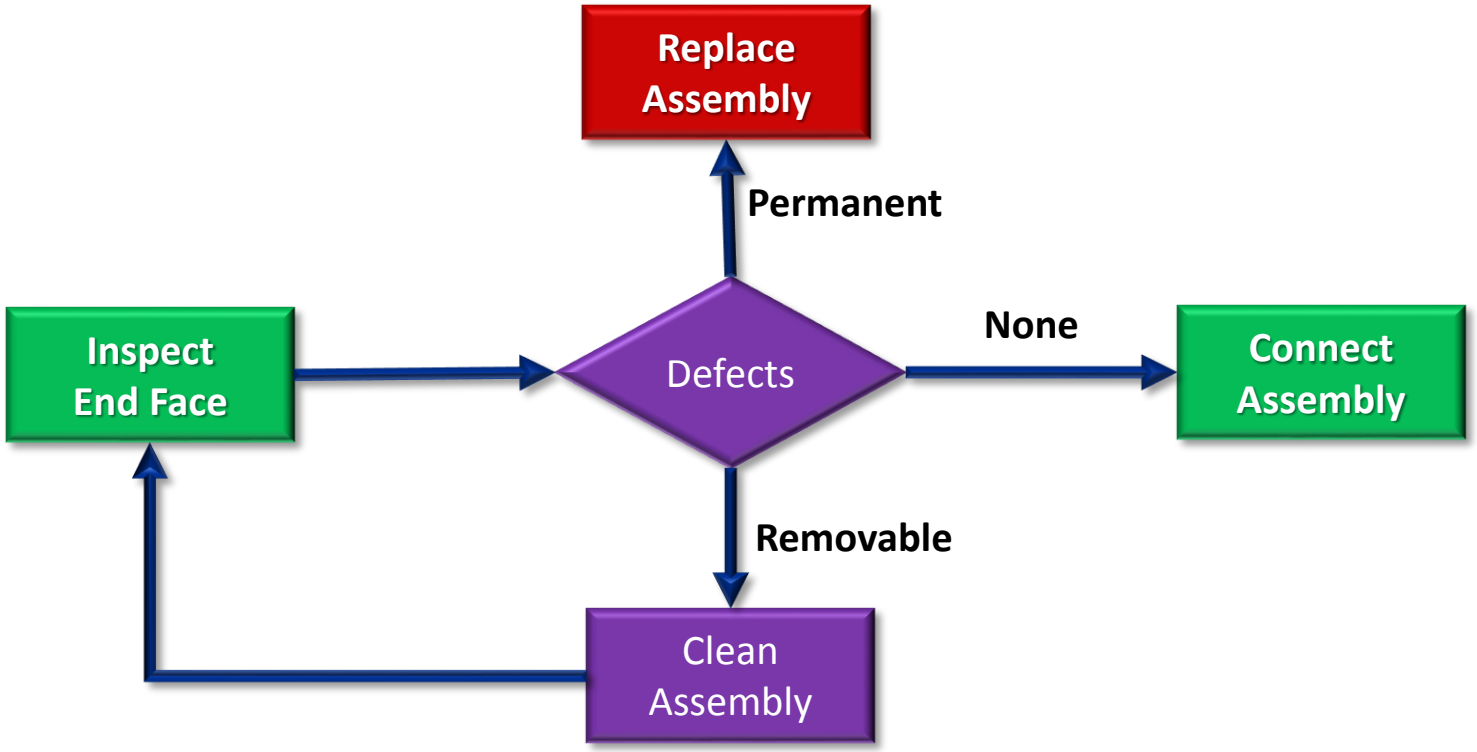
- **98%** of Network Contractors experienced fiber failures during the installation process
- **92%** of Network Contractors use Isopropyl Alcohol (IPA) as a cleaning agent
- **30%** of Network Contractors use compressed air for cleaning

Truck Roll Back Expense Stats:

- "The average truck roll is ~ **$150** NOT including labor. Labor **$50/hour**. The average PRISM truck roll results in a **three hour visit**." Matt Olson, Principal Architect at CenturyLink at CONF 2014
- National Association of Regulatory Utility Commissioners estimates a **truck roll costs upwards of $275** in 2014 and that **does not take into consideration the cost of parts**.

80% of a network installation expense is labor.
Doing the job right the first time reduces costs & frustration

BEST PRACTICE : INSPECT → CLEAN → RE INSPECT



- Recommended process from **iNEMI IPC 8497-1** & **IEC 61300-3-35**
- **Never** assume a new cable assembly or transceiver is clean
- No cleaning process is 100% every time and inspecting the end face is important

CRITICAL FACTORS FOR MATING MT FERRULES

Fiber protrusion varies between 1μm to 3 μm

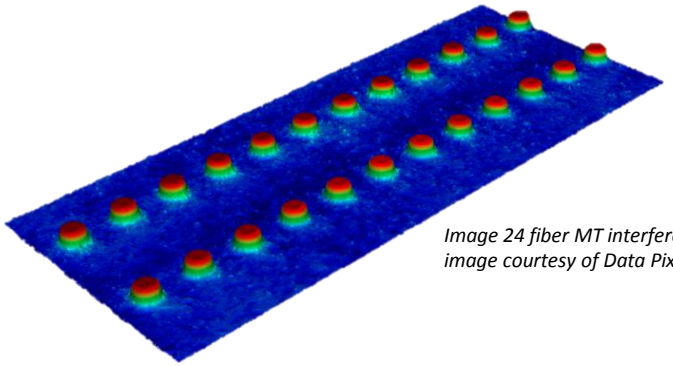
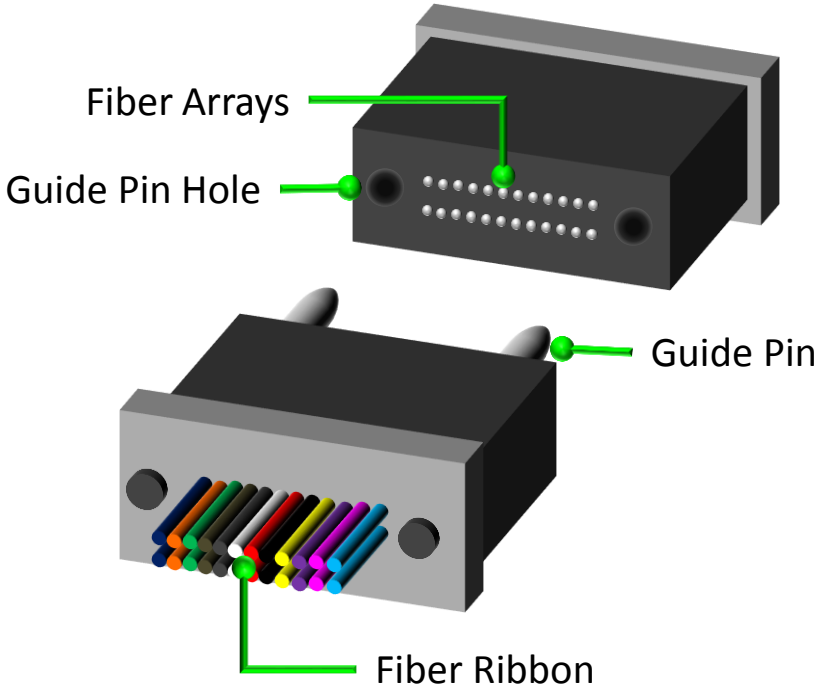


Image 24 fiber MT interferometer image courtesy of Data Pixel



- Fiber protrusion and end face geometry
- Shape & tolerance of guide pins
- Tolerance of the fiber and guide pin hole

It only takes a minuscule dust particle in the right place to wreak havoc

MATING MPO CONNECTORS

Mated MPO connector image courtesy of US Conec

QSFP 40GBASE-SR4 image courtesy of Arista

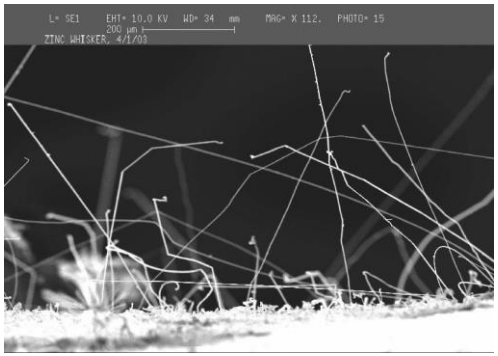
Contact Friction:

- Connector slider
- Retention clips in adapters and transceivers
- Guide pins

Wear debris is a common source for causing dust particulates

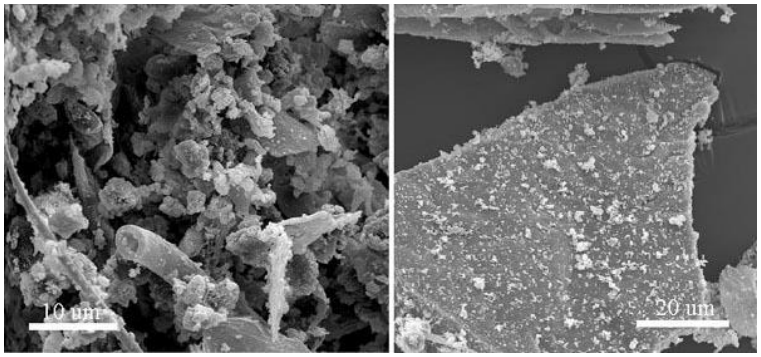
ENVIRONMENTAL SOURCES OF DUST CONTAMINATION

- Dead skin, hair, and clothing lint
- Foam based swabs and paper based wipes
- Zinc whiskers from electroplated surfaces
- Paper & cardboard packaging materials
- Protective end caps for connectors and adapters
- Airborne based pollen, molds, concrete dust



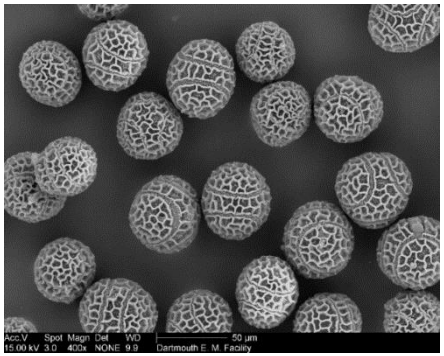
Zinc Whiskers

Source: NASA Electronics Parts & Packaging Program



Left: Dust from top of cabinet. Right: Paper Fiber(wood) from inside drawer

Source: Karen Brynjolf Pedersen & Morten Ryhl-Svendsen National Museum of Denmark



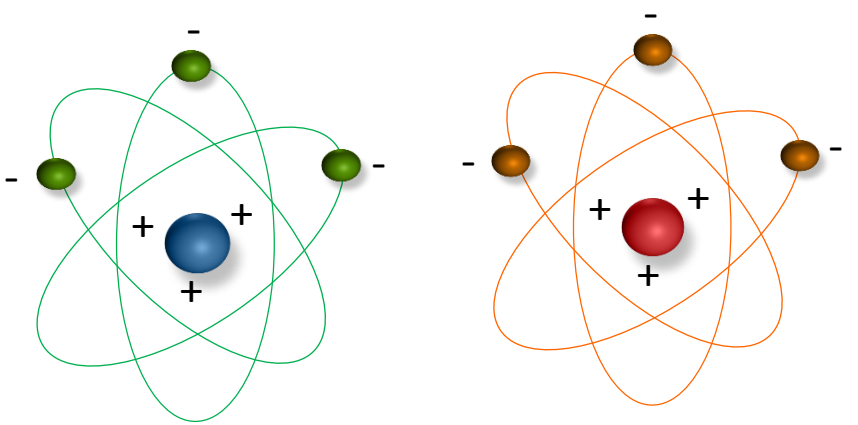
Flower Pollen

Source: Dartmouth College Electron Microscope Facility

Dust contamination is inevitable and the most common end face contaminate

ELECTROSTATIC CHARGE FROM CONTACT FRICTION

Before material contact:



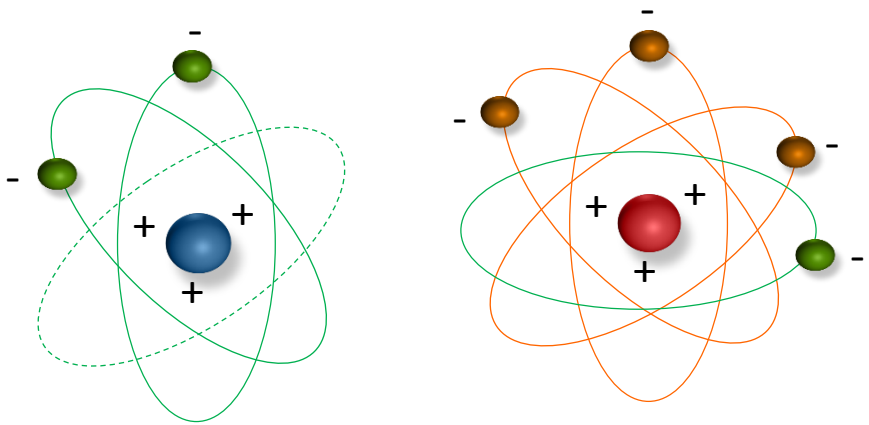
Material 1

-3 Electrons
+3 Protons
0 Net

Material 2

-3 Electrons
+3 Protons
0 Net

After material separation:



Material 1

-2 Electrons
+3 Protons
+1 Net

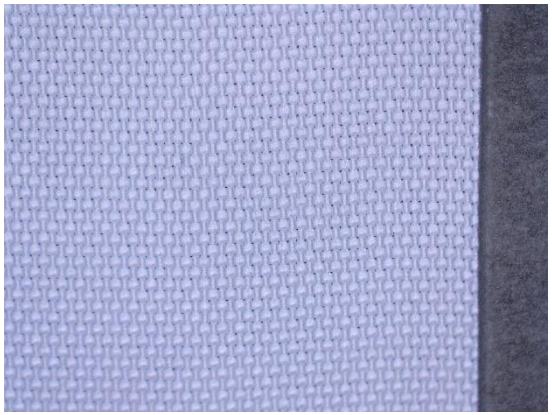
Material 2

-4 Electrons
+3 Protons
-1 Net

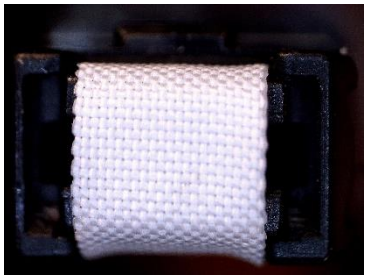
Most structured cabling applications have low humidity and susceptible to triboelectric charging

CASSETTES FOR CLEANING MT END FACES

- Cassettes are good for cleaning end faces in production environment
- Uses micro woven, ultrasonically cut cleaning ribbon
- Capable of dry or wet-dry cleaning



CLICKER FOR CLEANING MT END FACES



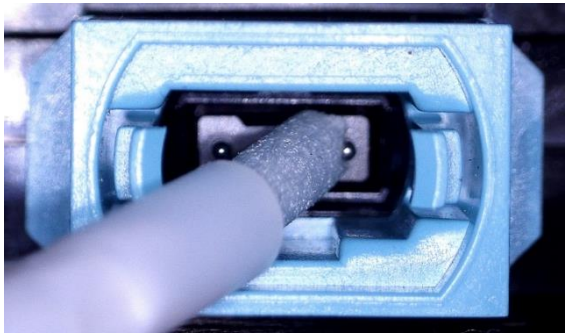
- Clickers are good for cleaning end faces during network installations
- Cleans both in adapter (male MT) and cable assemblies (female MT)
- Uses micro woven, ultrasonically cut cleaning ribbon and self aligning

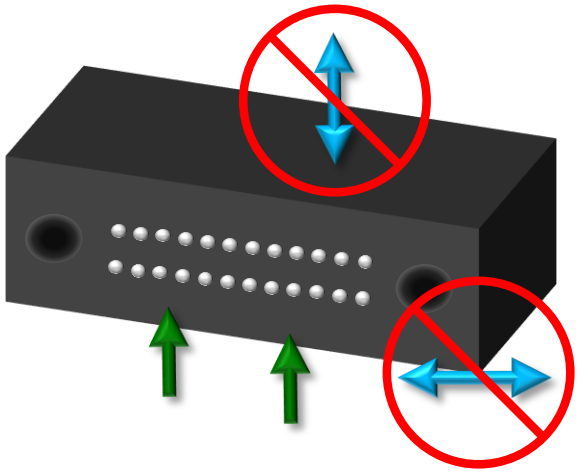
Best Practice for Wet-Dry:

- Apply small amount of cleaning fluid to an optical grade wipe
- Touch the cleaning tip of the clicker on the wet spot on the wipe
- Do NOT apply the cleaning fluid directly to the cleaning ribbon

STICKS FOR CLEANING IN ADAPTER MT END FACES

- Sticks are good for cleaning end faces that have difficult to remove contamination
- Stick and fluid eliminates electrostatic charge
- Always wipe the end face single direction going along the parallel array





CUTTING CORNERS WITH KNOCK OFF PRODUCTS

- Clickers and cassettes cleaning performance is 100% dependent on all of the components working together as a mechanical system
- The knock off manufacturers reduce production costs by using lower quality components, expanding the tolerances on the components, and eliminating quality control steps

Telltales of Knock Off Products

- No Brand name
- No manufacturer
- No country of origin
- Generic packaging

CAVEAT EMPTOR ON KNOCK OFF PRODUCTS

When YOU make the decision to purchase knock off products, You exposed your company to:

- Using products that will have no support when quality instances happens
- Jeopardized relationships and lost of trust with legitimate suppliers
- Potential legal action for violating product patents
- Lower profits (if you are a distributor reselling the knock off products or end user having to clean end faces multiple times)

Assuming 80%+ of an installation cost is labor, a high quality product gets the job done right the first time and lowers your OPEX.

For More Information Contact:

For further information contact:

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Toll Free in US: 800-IS-FIBER or 800-473-4237 . Direct 508-992-6464
Email: sales@focenter.com

Additional resources from the FOC team include:

- FOC technical solution content: http://bit.ly/29WTvgn
- Glossary, Acronyms, Military Specifications for Connectors: http://bit.ly/2a2EFn8
- Q&A Resource: email technical questions to AskFOC@focenter.com