STICKLERS™

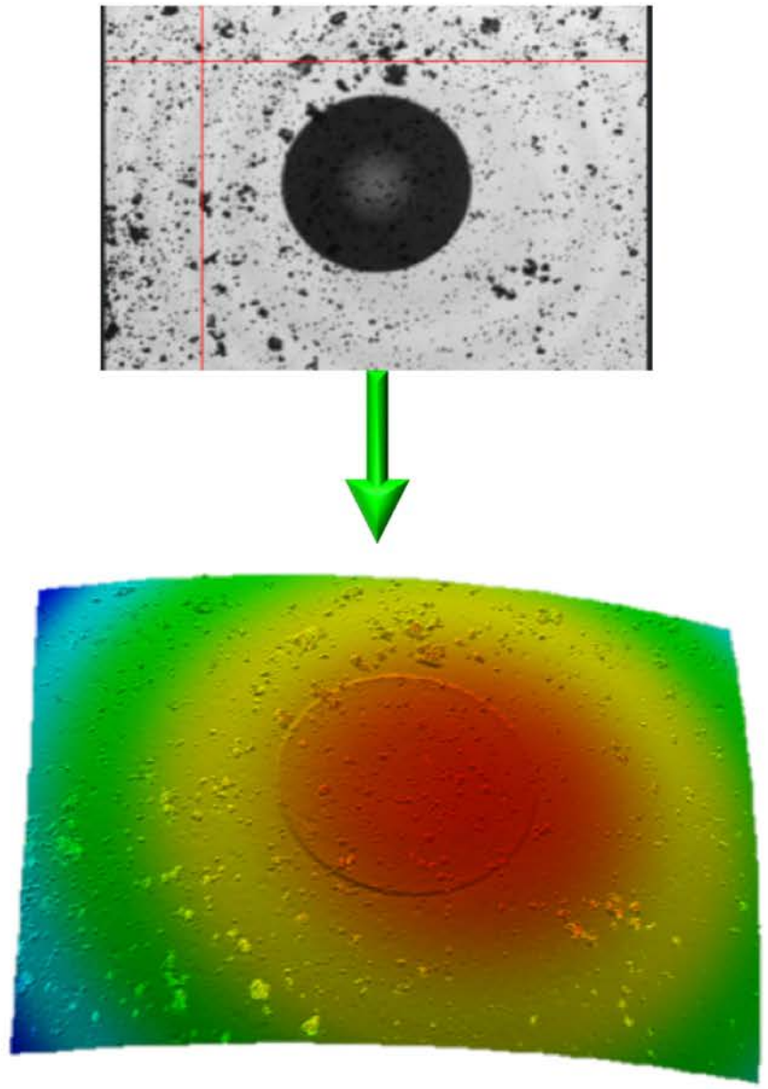
When you need perfectly clean splices & connectors™

JAVFOWG Fiber Optic Cleaning

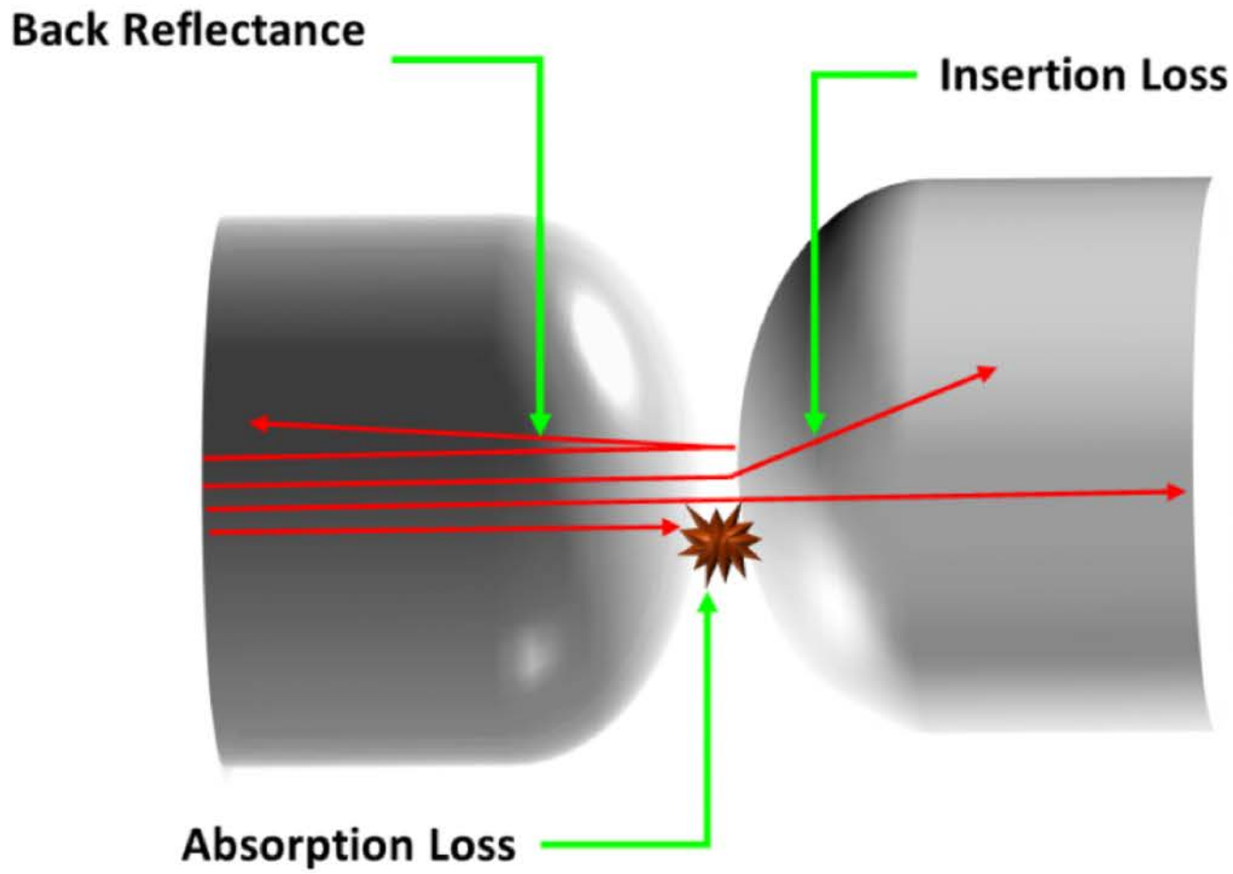
Agenda

- **Contamination**
- Working with Optical Grade Wipes
- Sticks & Clickers
- Optical Grade Fluids & Dusters
- Best Practices Wrap Up

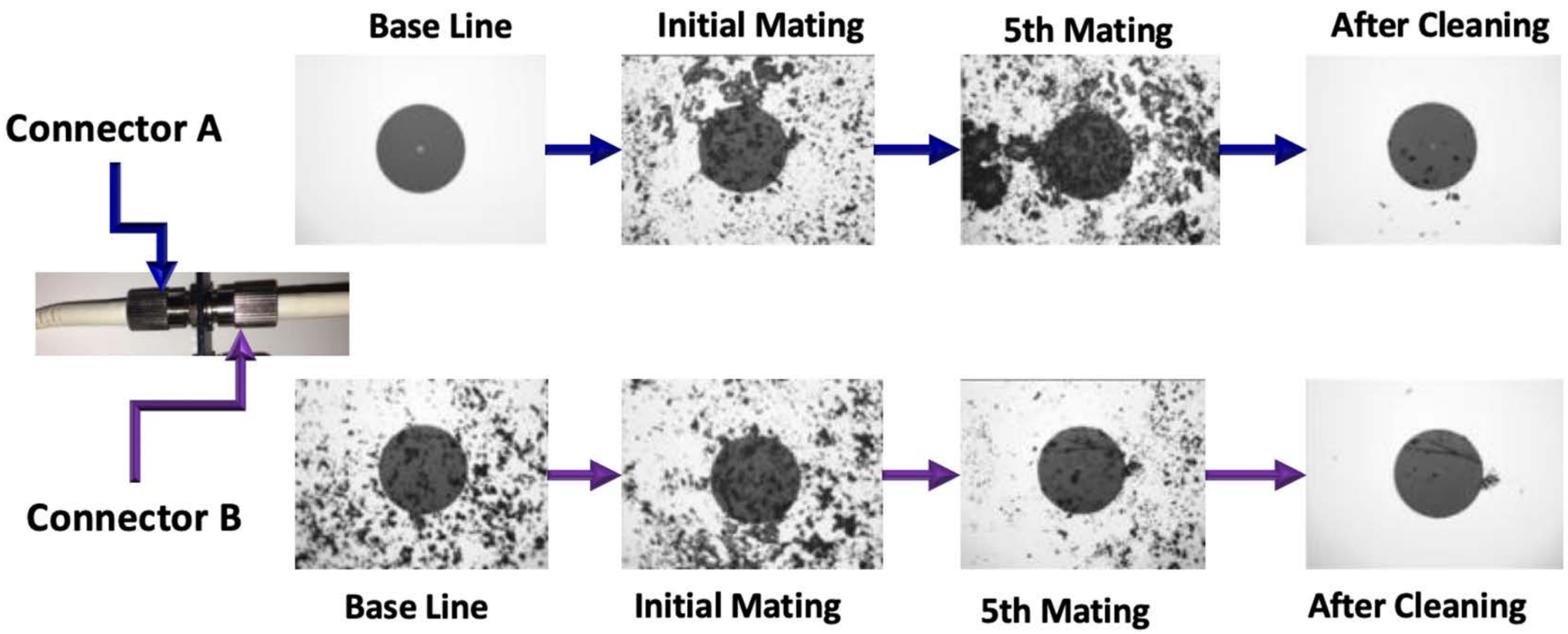
End Face Contamination - Dust



Two images of the same ferrule

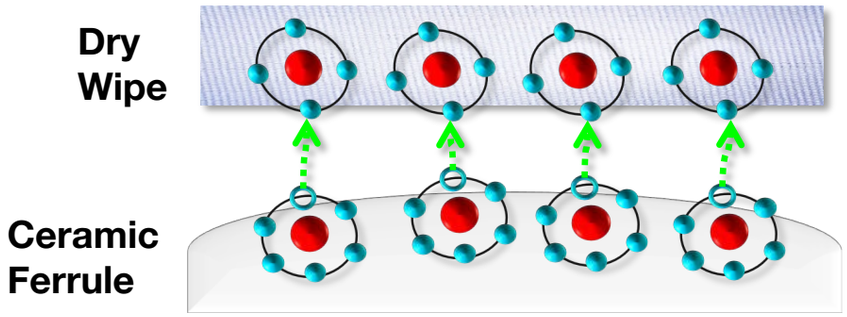


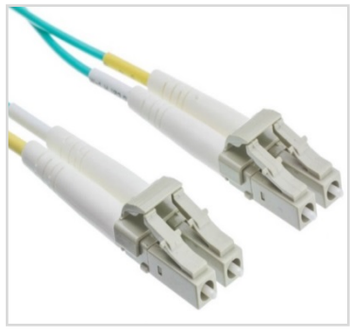
Cross Contamination Example of Dust

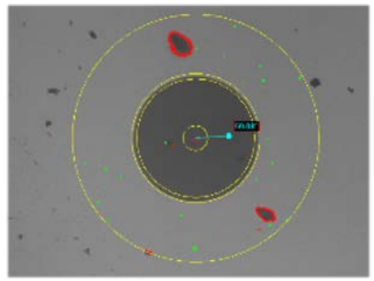


- Dust particulates are the most common type of end face contamination
- The dust particles will transfer, break apart, and transfer as the number of mates increases
- The last images show the permanent defects like scratches and pits that ruin the connector pair

Electrostatic Charge Impact on Fiber Connections







IEC 61300-3-35 Inspected LC with dust

<u>How do surfaces get charged – Electostatic discharge</u>

- A charged ferrule surface will attract dust particulates which negatively impacts the insertion loss of the mated connector pair
- Contact friction knocks the electrons around both surfaces
- The surfaces with the most friction develop the highest levels of electrostatic charge
- Charged dust particles are attracted to each other and accumulate
- Dielectric ceramic and composite fiber optic ferrules are electrical insulators and the electrostatic charge does not decay
- Dry wipes, non ESD plastic materials on Clicker tools, dry climates, lack of humidity in air, are all driving forces for an ESD event

<u>Where does the dust come from?</u>

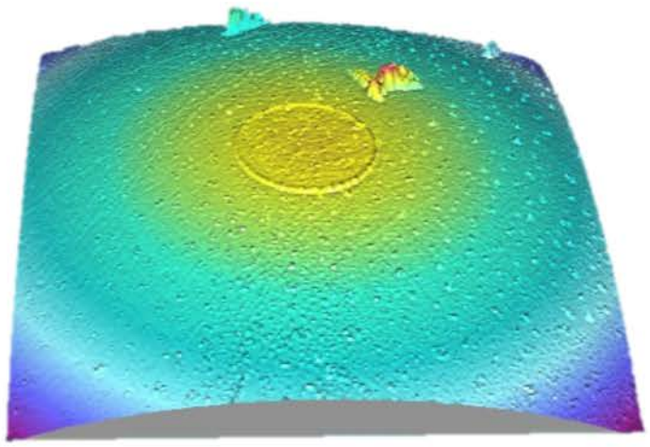
- Dust on test and inspection equipment
- Wear debris from the contact friction of the connector parts from the mating and de-mating process
- Charged dust particles in the air coming from the cooling fans on networking gear and the HVAC system

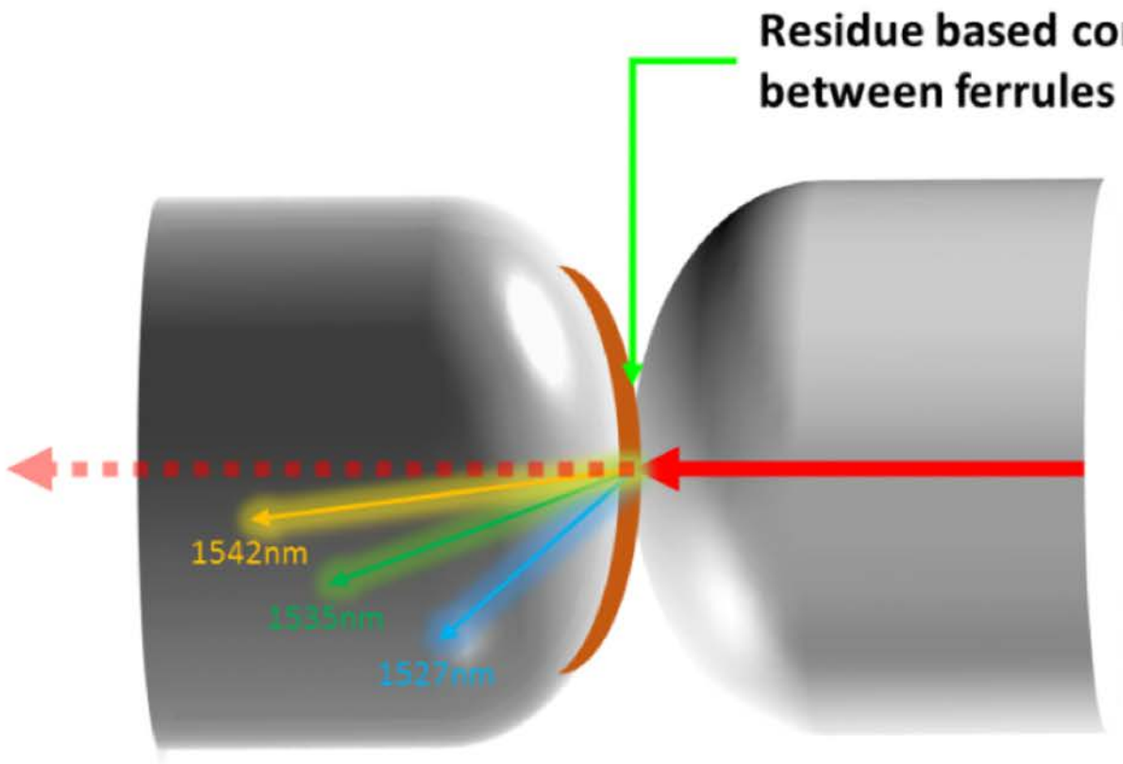
<u>Solution</u>

- *The only way to confidently eliminate electrostatic charge is to introduce a cleaning fluid like the Sticklers Fiber Optic Splice & Connector Cleaner precision cleaning fluid – wet to dry procedure*
- *Sticklers CleanClickers have static dissipative material in the plastic to eliminate most events*

End Face Contamination - Residue

End face with IPA

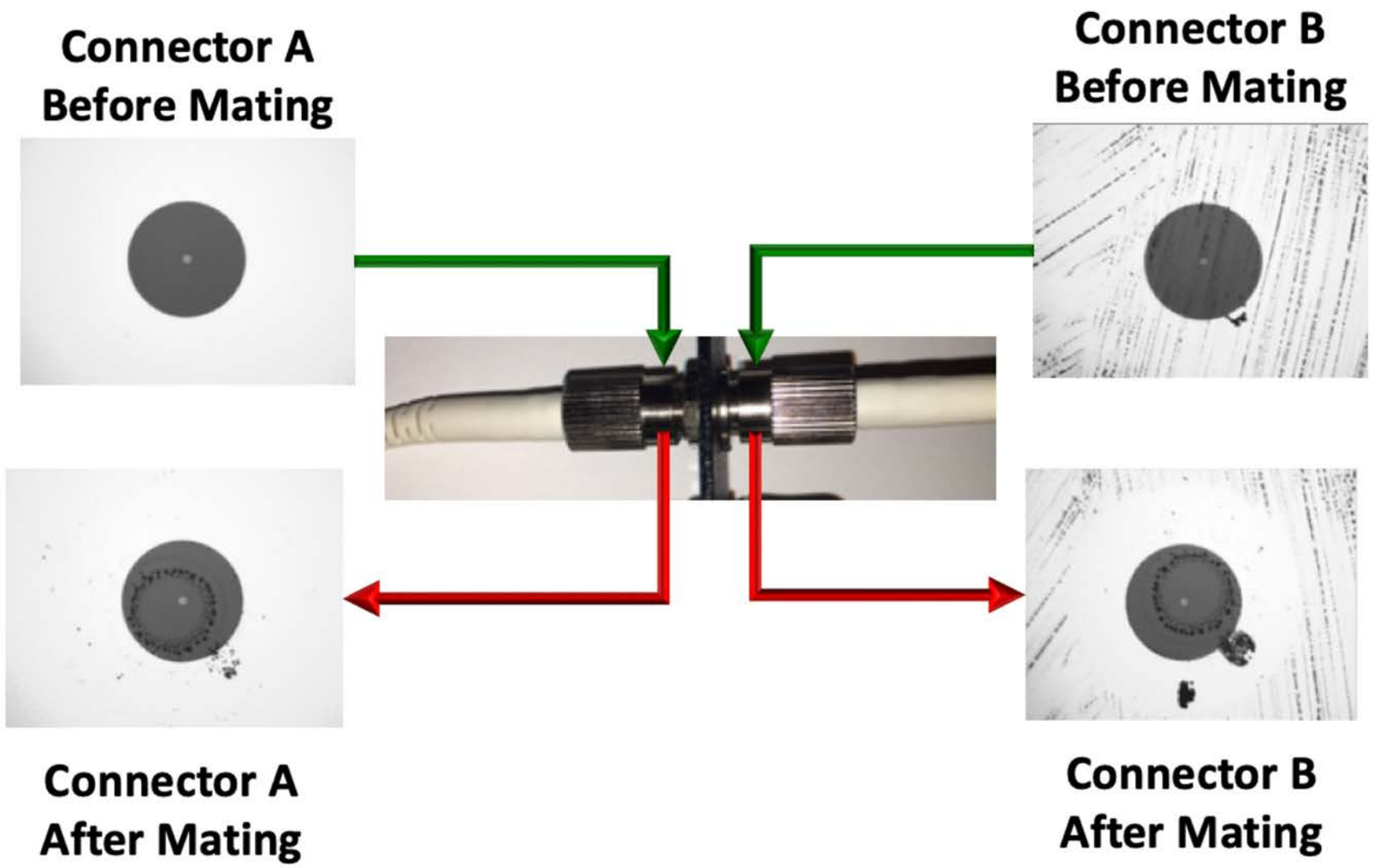




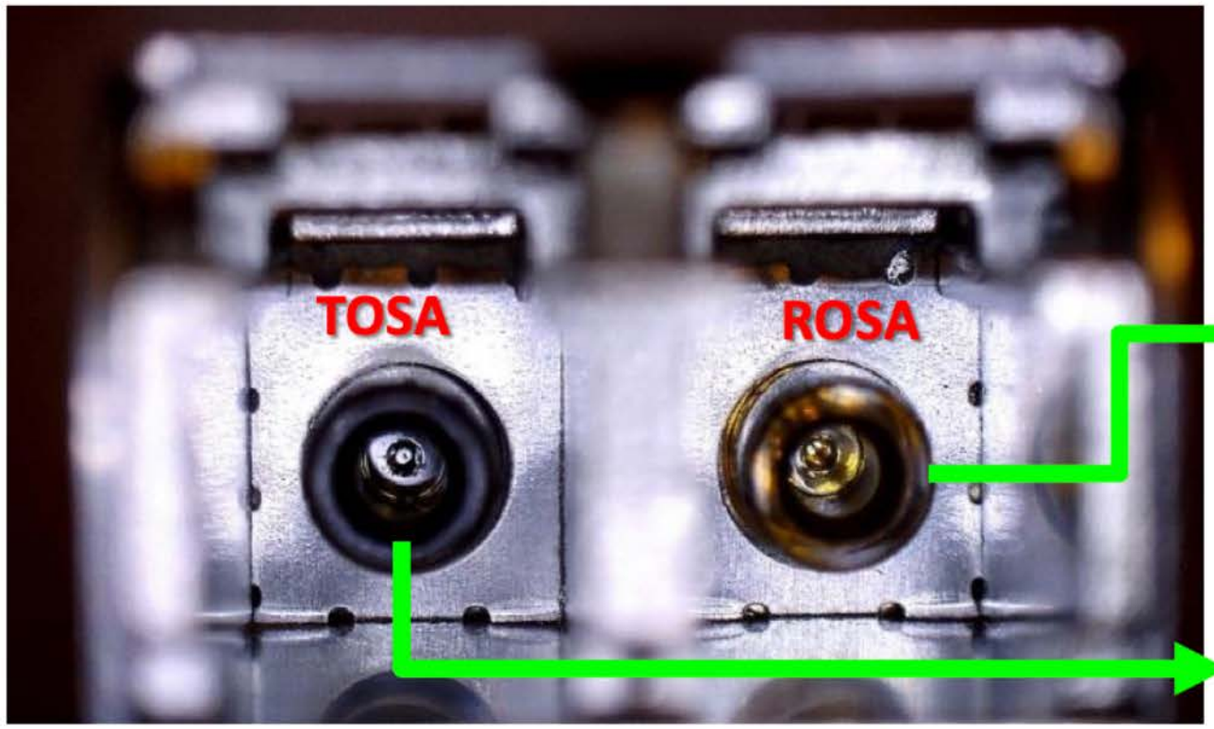
Chromatic aberration
Caused loss of wavelengths

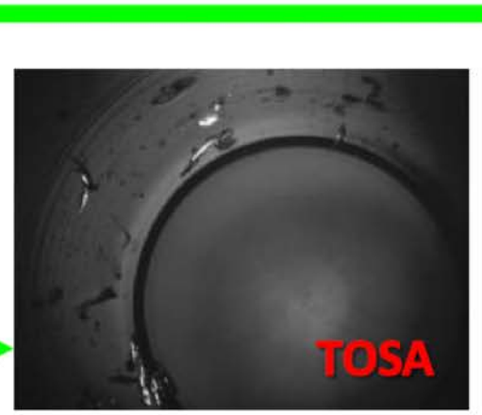
Cross Contamination Example of Residues

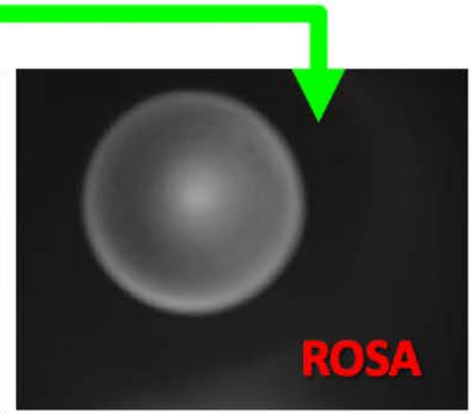
- Cleaning only one end of a connector pair is common source for cross contamination
- The coffee ring stain is the typical tell sign



Transceivers Contamination



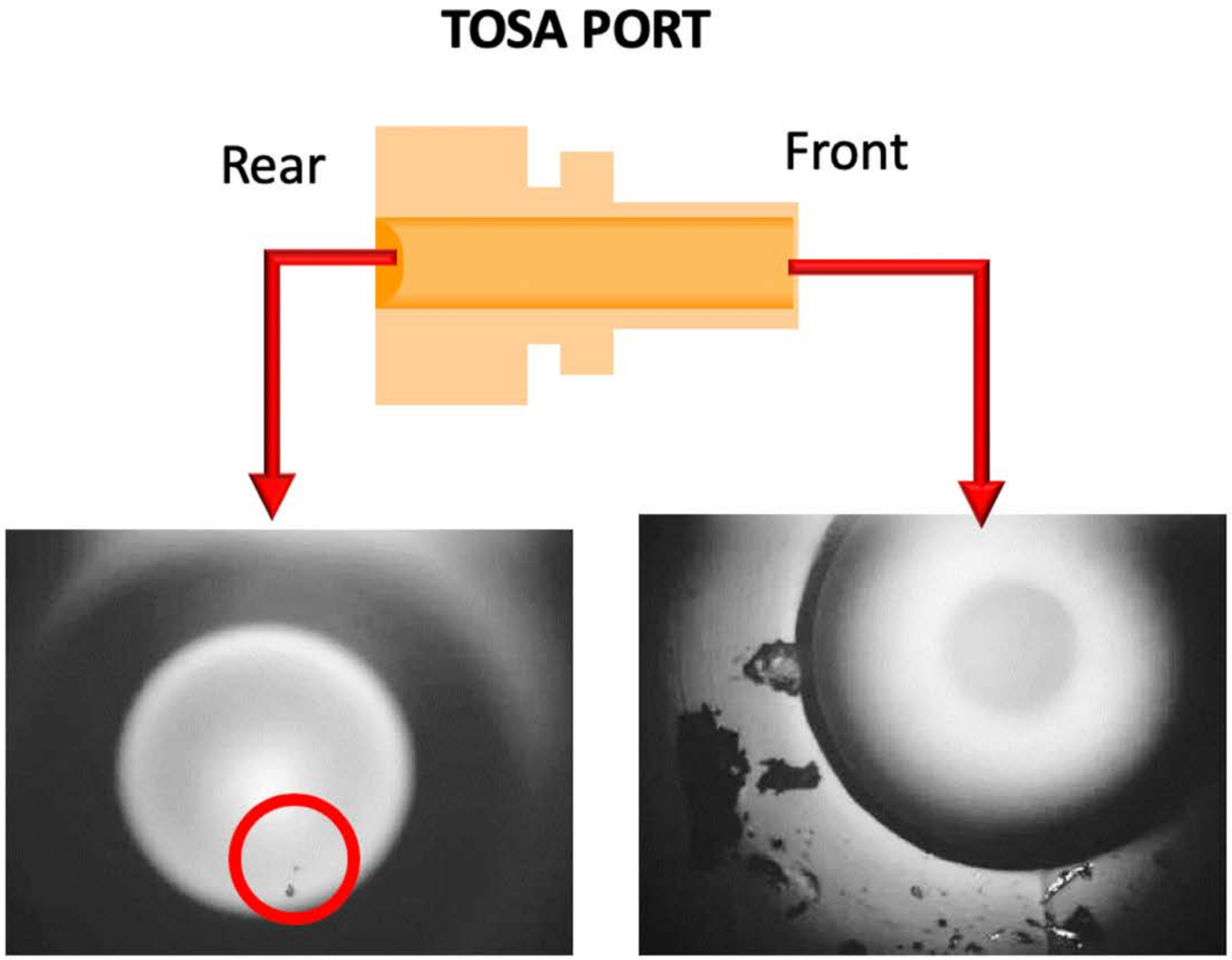




TOSA is contaminated with metal shavings, dust from the wear of the end cap, and small droplets of oil. There was dust along the side wall on the **ROSA**.

Transceivers Contamination

Inspecting transceiver ports using a Viavi FiberChek PRO ferrule scope



Small oily droplets on lens

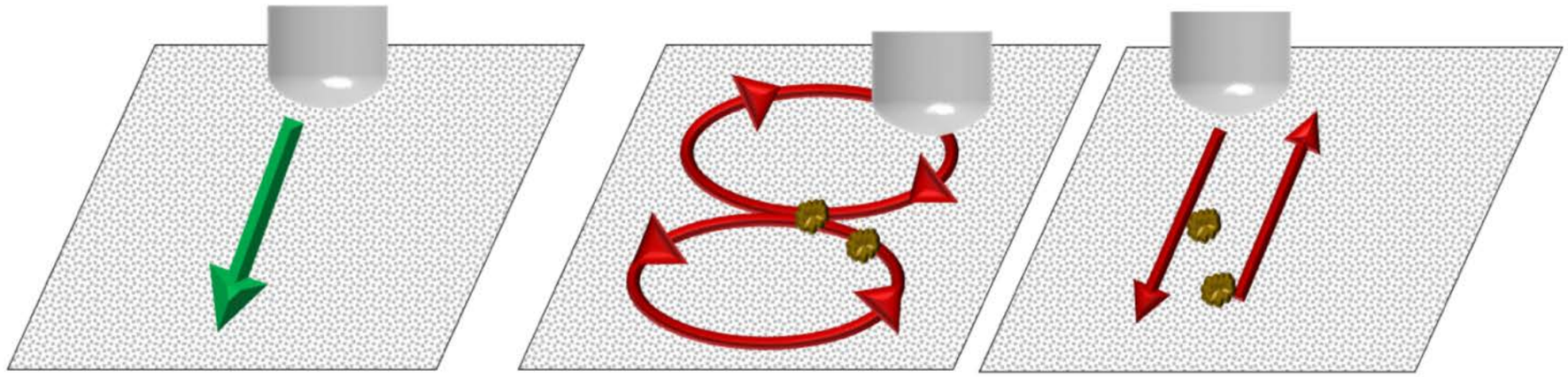
Metal shavings and dust possibly from the end caps on the outer edge.

Agenda

- Contamination
- **Working with Optical Grade Wipes**
- Sticks & Clickers
- Optical Grade Fluids & Dusters
- Best Practices Wrap Up

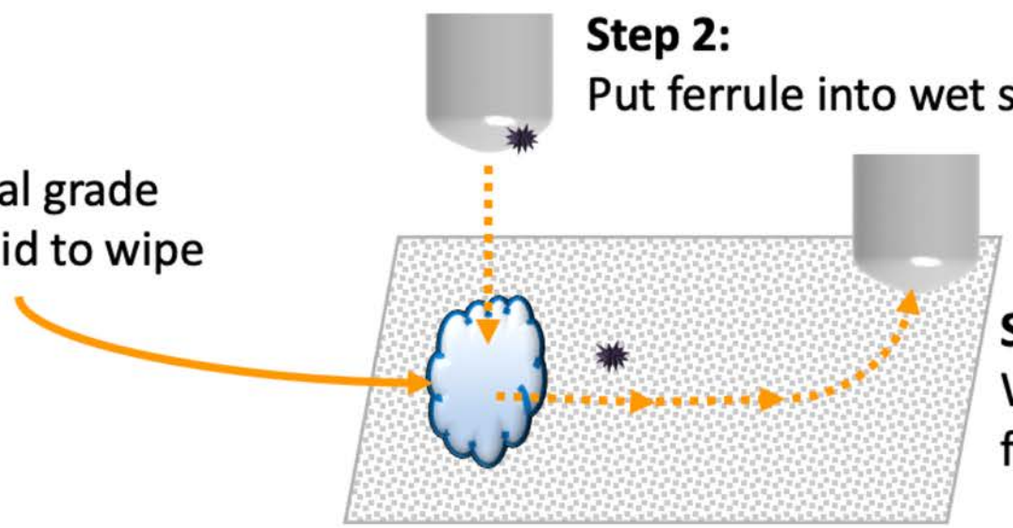
How to Use a Wipe Effectively

Always wipe in an optical connector going in a single direction



A figure 8 motion or a back and forth wiping motion will reapply the contamination you just wiped off back onto the connector

Step 1:
Apply optical grade cleaning fluid to wipe



Step 2:
Put ferrule into wet section of wipe

Step 3:
Wipe ferrule going from wet section and finishing in dry section going in one direction

STICKLERS

What to Look for in a Wipe

High shearing strength

- Optical grade wipe will not have the wipe material separate
- Can be used for dry wipe cleaning or a wet-dry cleaning
- Paper products will generate lint

Wipes need to stay clean

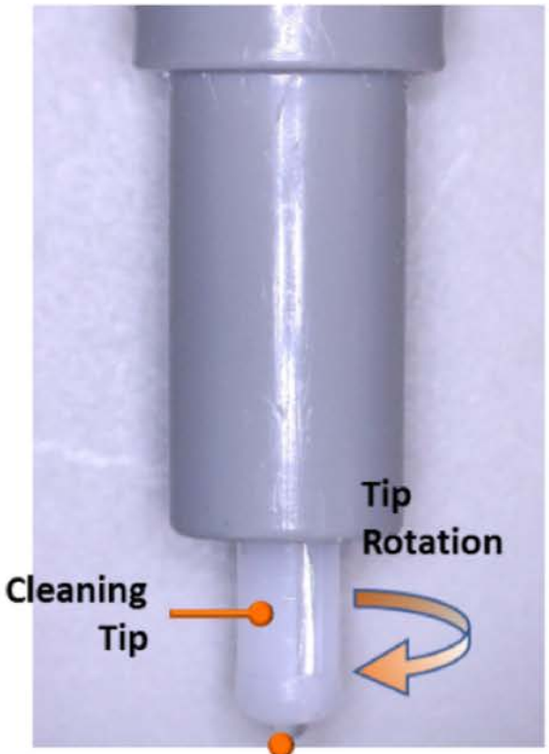
- Plastic tubs, cassette, and individual wipes protect from the elements
- Paper boxes and the wipes in them are ruined with spills

Agenda

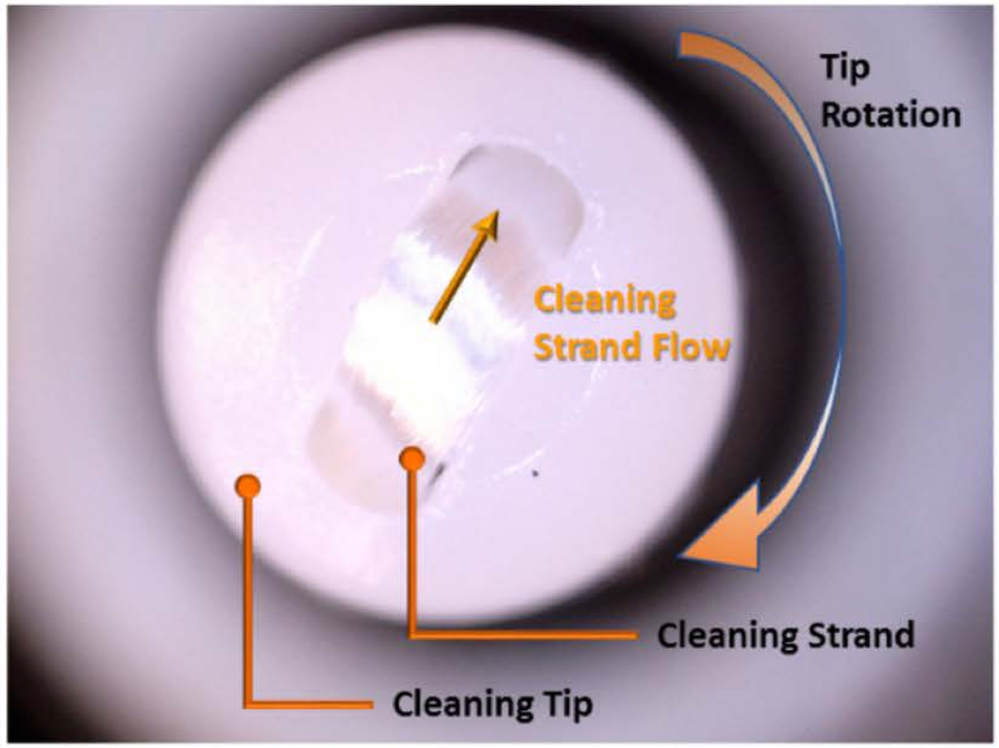
- Contamination
- Working with Optical Grade Wipes
- **Sticks & Clickers**
- Optical Grade Fluids & Dusters
- Best Practices Wrap Up

How Clickers Wipe an End Face

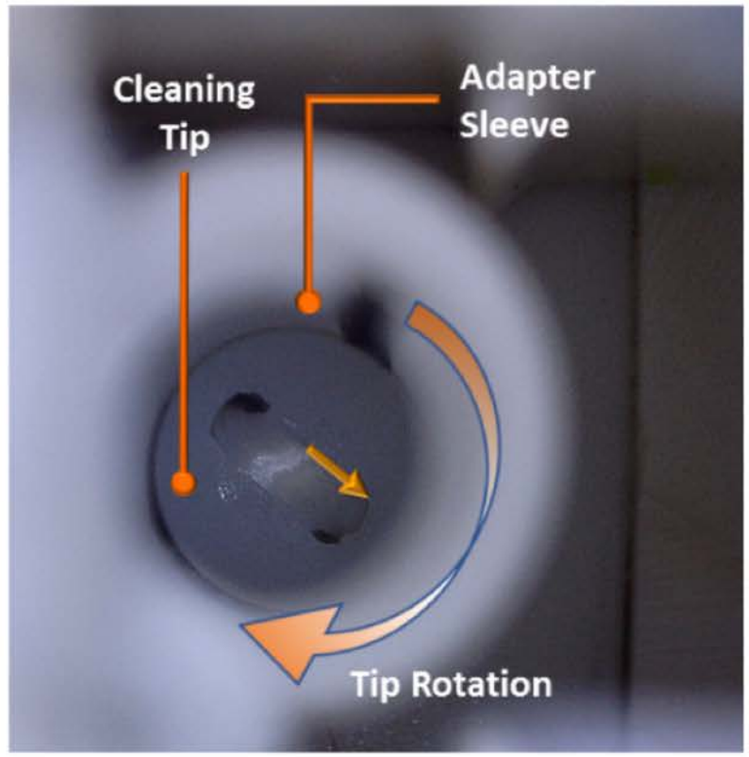
Profile of a Clicker's Tip



Head On View of a Clicker's Tip



Clicker's Tip in a SC Adapter



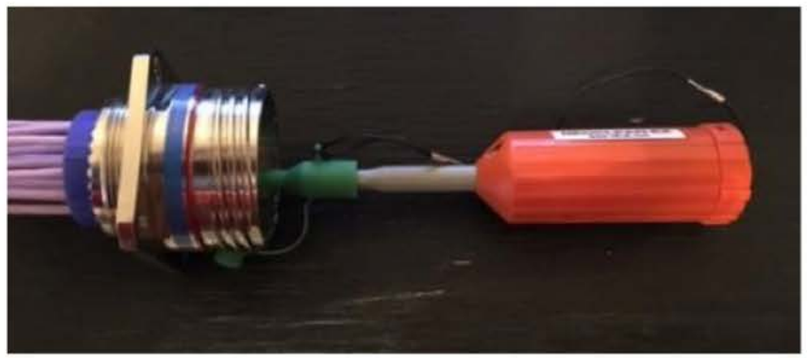
Sticklers CleanClicker has quality tip and strands, does not cause an ESD event, drives gears that work consistently throughout the 750 Cleans, all of which make the CleanClicker the ideal tool

STICKLERS

Wet-Dry with a Clicker

Why Wet-Dry?

- The cleaning fluid will improve the effectiveness of wipe of the cleaning strand
- The introduction of the fluid raises the local humidity levels for preventing triboelectric charging



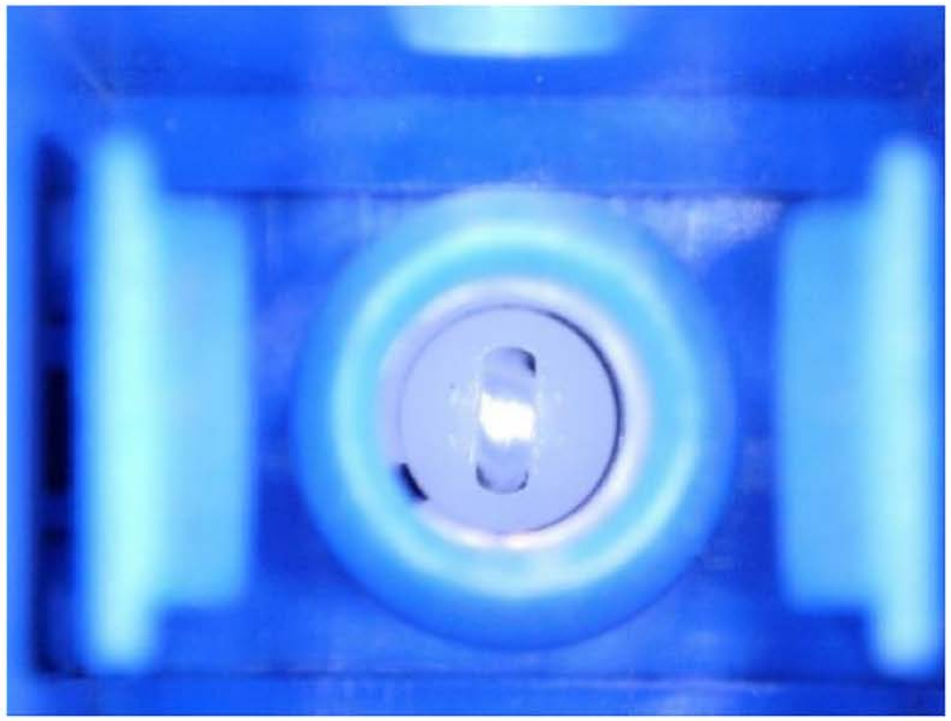
1. Wet the cleaning tip by touching it the wet spot on a wipe. Do **NOT** apply the cleaning fluid directly to cleaning tip. If you do, you will oversaturate the cleaning strand.

2a. To clean the 29504/5 socket terminus, insert the clicker into the socket and engage at least 3X.

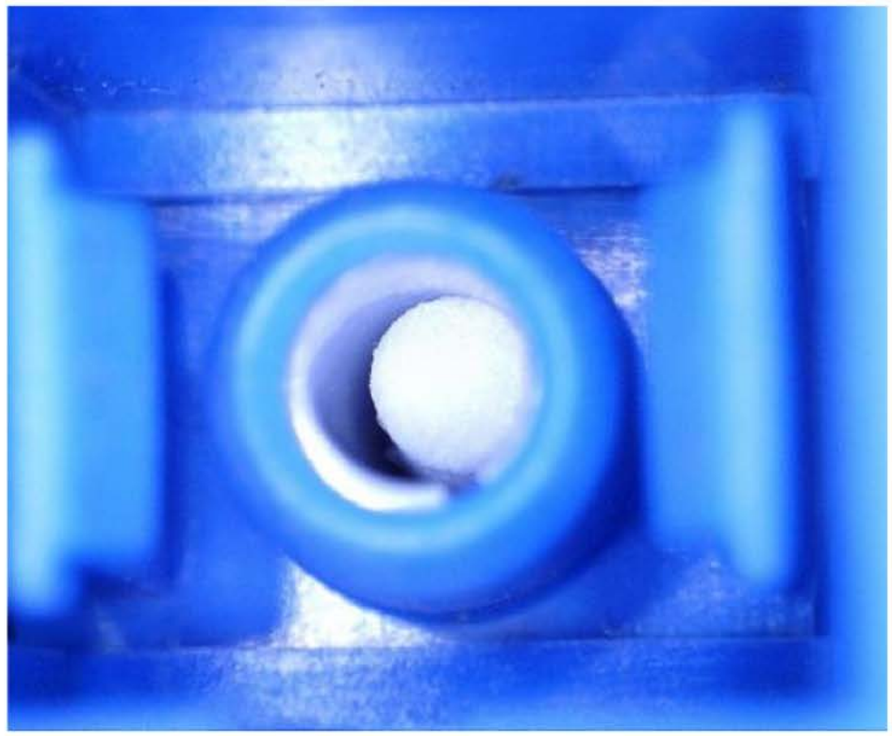
2b. To clean the 29504/4 pin terminus, place the end cap on and slide on the pin terminus and engage at least 3X

Sticks vs Clicker

Clicker in an Adapter



Stick in an Adapter

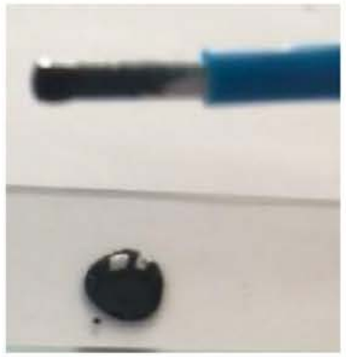


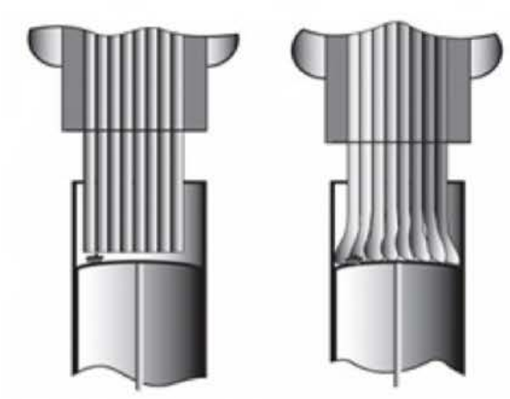
- Clickers are good quick cleaning for light levels of contamination
- Sticks have a larger cleaning region, pull contaminates from the sidewall of adapter sleeve/socket wall, & provide a more comprehensive cleaning

What to Look for in a Stick

Sintered strand cleaning tip advantages

- The manufacturing process does not use binding adhesives that leach out
- The strands do not come loose
- Capillary action for drawing up contaminates into the tip
- Mechanical crimp that secures the cleaning into handle prevents damaging from excessive pressure by operator





Recessed cleaning tip for pin terminus

Longer cleaning tip cleaning socket terminus through inspection adapters

Color coded handles based on ferrule type

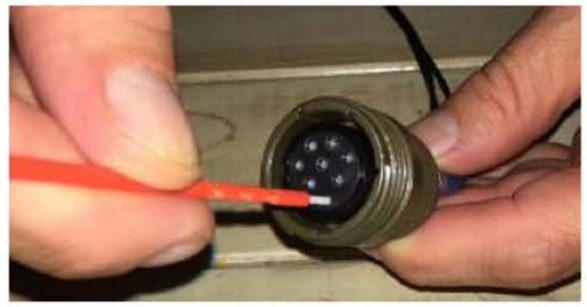
Cleaning MIL PRF 29504 Socket Termini

MIL 29504/5 Socket Cleaning Process:

Step 1: Tilt can of the Fiber Optic Splice & Connector Cleaner slightly and gently press on orange cap

Step 2: Insert the red 1.6mm CLEANSTIXX stick in the side port of the orange cap wetting the tip of the cleaning stick

Step 3: Insert the stick into the socket and rotate 6x to 10x in the same direction



MIL 29504/4 Pin Cleaning Process:

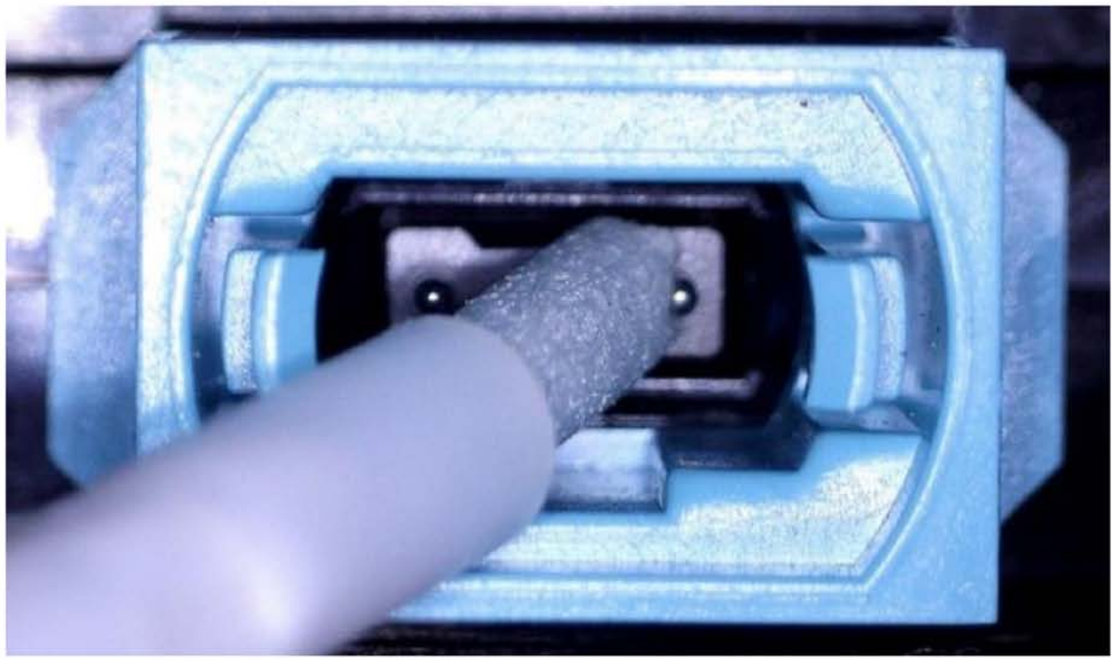
Step 1: Tilt can of the Fiber Optic Splice & Connector Cleaner slightly and gently press on orange cap

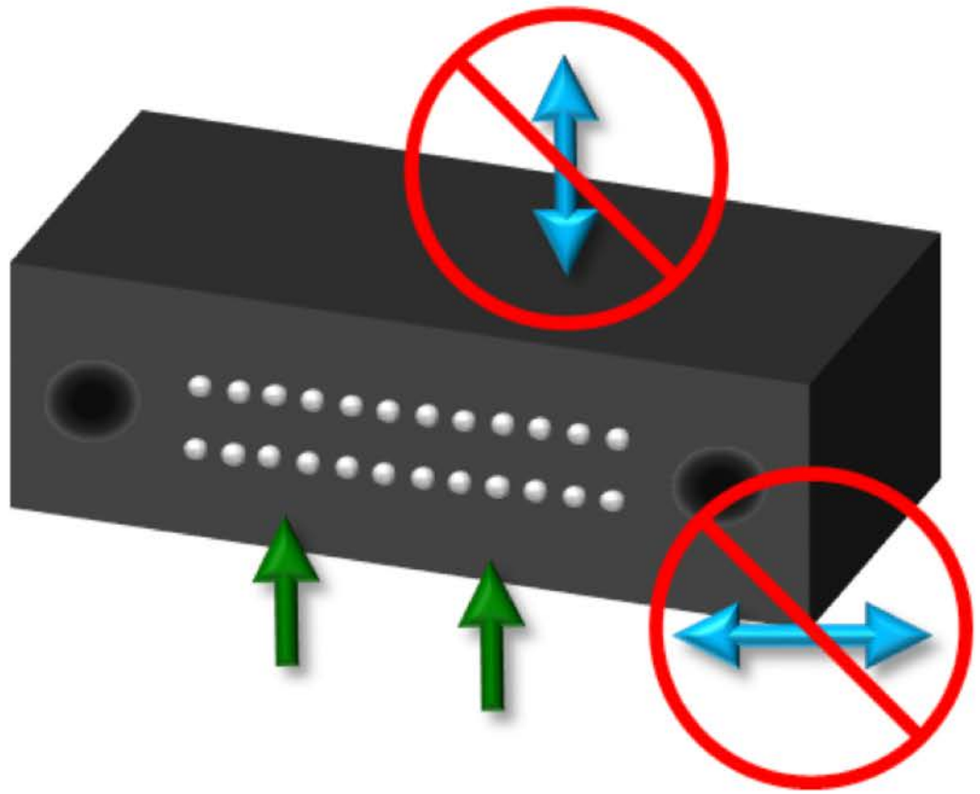
Step 2: Insert the red 1.6mm CLEANSTIXX stick in the side port of the orange cap wetting the tip of the cleaning stick

Step 3: Apply the stick onto the pin termini and rotate 6x to 10x in the same direction

- **For best results, always rotate the cleaning stick in the same direction**
- **Do NOT reuse cleaning sticks to prevent reapplying the contamination removed from the previous terminus**
- **Apply the same amount of pressure to the cleaning stick as you would use for writing with a pen.**

Cleaning MT Based Termini





- 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

Agenda

- Contamination
- Working with Optical Grade Wipes
- Sticks & Clickers
- **Optical Grade Fluids & Dusters**
- Best Practices Wrap Up

Why a Fiber Optic Fluid is Better than IPA

Hydrofluoroether (HFE) cleaners have low boiling point, low surface tension, and high vapor pressure

- It evaporates faster and does not does not leave a residue
- Will not freeze like aqueous (water) cleaners and does not have a shelf life

Non flammable and non toxic

- It is air ship safe and the 3oz can are carry on safe
- There are no shipment restrictions and is globally GHS, RoHS & REACH Compliant

Comes in hermitically sealed cans with a Triton style cap

- Use a high purity pump engine that is free of lubricants
- No spills or cross contamination from humidity and dust in the air
- Enables three ways to dispense cleaning fluid

What to Look for in a Duster

Optical Grade Duster

Commercial Grade Duster

Dusters sold at the big box retailers are **flammable** and most use **oil** as a propellant which enters the air stream

Optical grade dusters are **non flammable** and processed for a high purity air stream. The trigger mechanism use high performance seals that will **not outgas** nor degradation during temperature cycling.

Agenda

- Contamination
- Working with Optical Grade Wipes
- Sticks & Clickers
- Optical Grade Fluids & Dusters
- **Best Practices Wrap Up**

Situational Awareness

What kind of contamination have the connectors been exposed to?	What are the work conditions like at the work site?
▪ Residues, Dust, Both ▪ Light, Medium, Heavy Levels	▪ Ventilation and Air Flow ▪ Flammability Concerns ▪ Operating and Storage Conditions

How do the cleaning fluids need to be transported ?	What are regulatory requirements?
▪ Air Shipment Requirements ▪ HAZMAT Restrictions ▪ Spill and Leak Concerns	▪ DOT Restrictions ▪ RoHS, REACH, GHS Compliance

STICKLERS

Final Thoughts

Best Practices for Cleaning Fluid:

- Use hermetically sealed containers to avoid cross contamination
- Less is more – Dispense just enough to clean a connector

Best Practices for Sticks & Swabs:

- Rotate stick at least 6X in a single direction
- Limit force to about the same pressure you would use for a writing pen
- Never excessively scrub the end face to prevent scratching with wear particulates

Best Practices for Wiping Connectors:

- Wipe connectors in a single direction
- Always wipe MT based connectors (i.e. MPO) in a single direction vertical direction 
- Tilt end face for APC so the 8˚ angle is touching the wipe

General Best Practices:

- Never look directly into a connector with the bare eye
- Inspect, clean if necessary & re-inspect
- Reusing wipes & sticks causes cross contamination