STICKLERS™

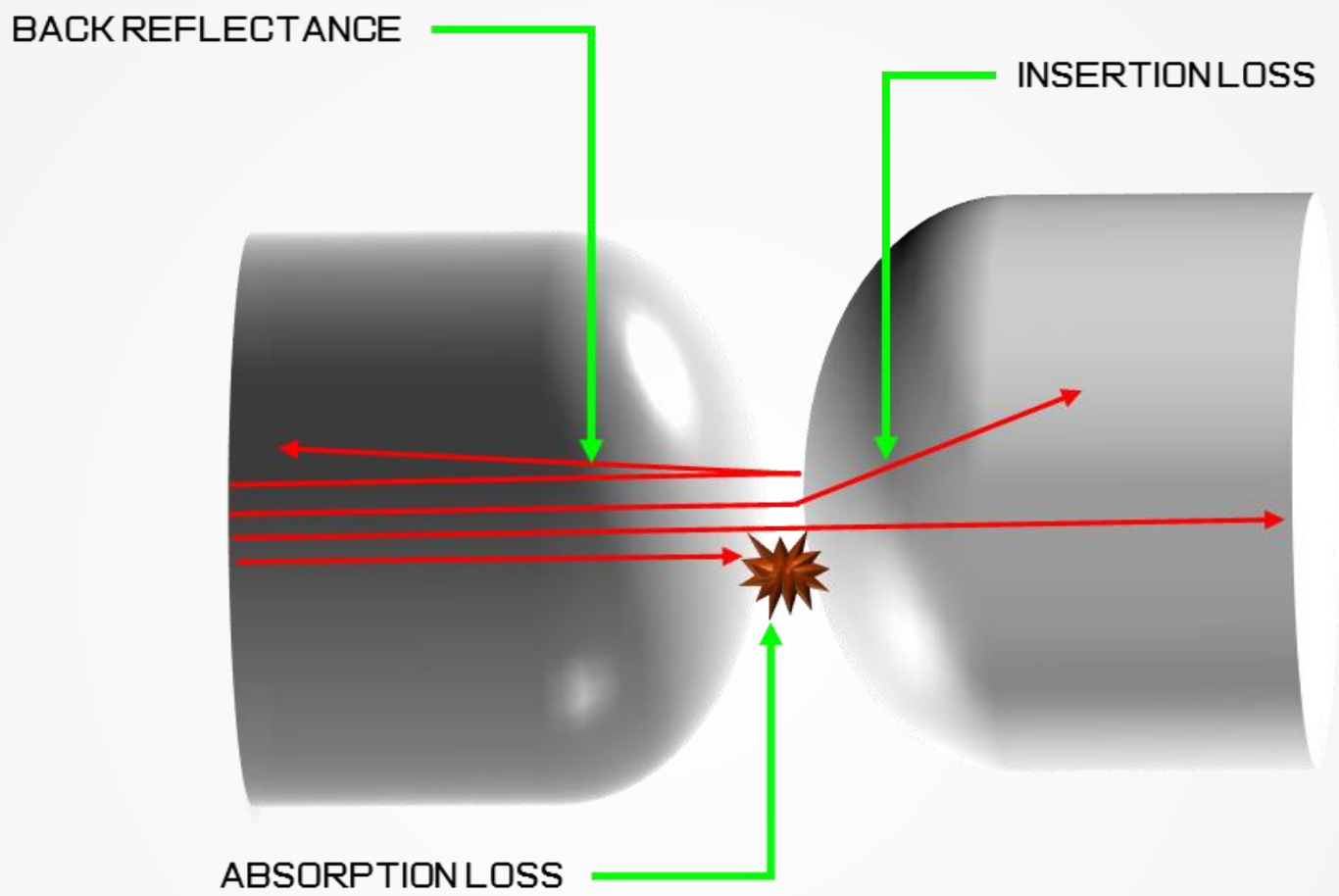
When you need perfectly clean splices & connectors™

Rick Hoffman, National Account Manager

Why Clean Fiber Optic Cable and End-faces

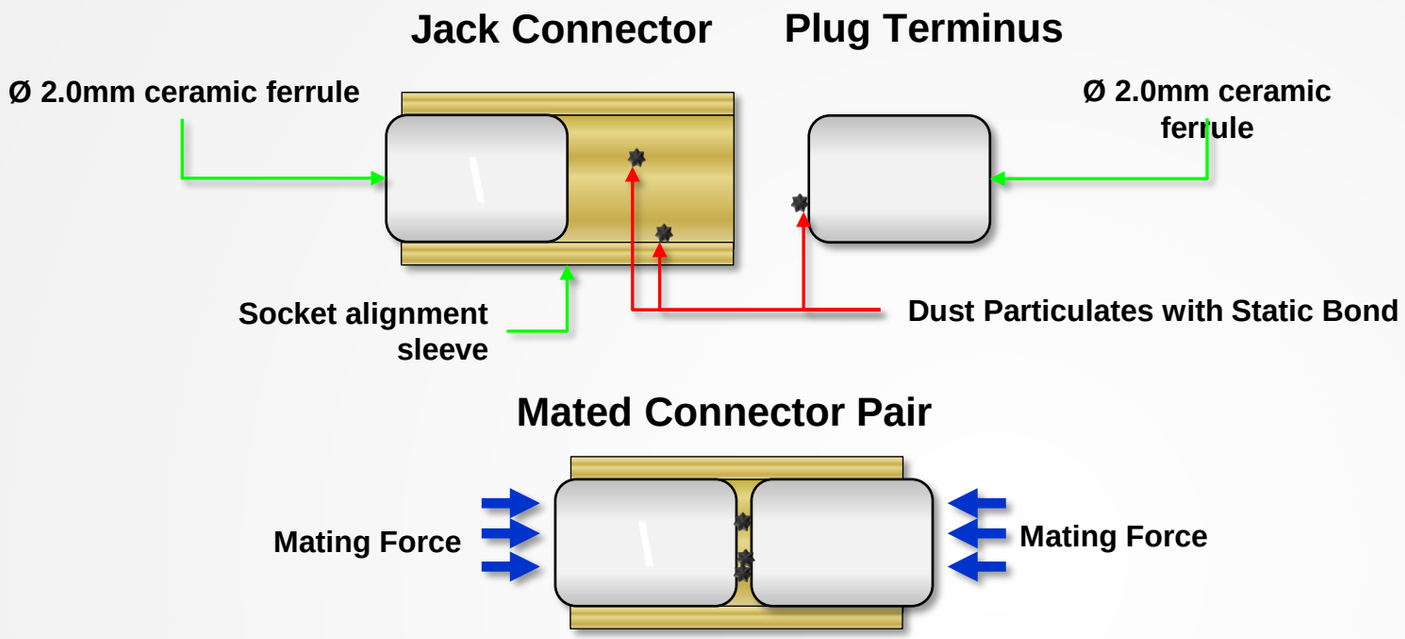
Dust Contamination

Residue Contamination



Signal loss = Unhappy Customers

Contamination and Causes



- Dust residing on sleeve is literally pushed into the contact zone of the mated connector pair
- The mating force between the two ferrules is ~ 15,000psi in the contact zone
- The dust breaks apart and is ground into the ceramic and glass
- The dust contamination causes scratches and pits on both fiber end faces – This causes a return to the factor for repair – time and money
- Oil based contamination or residues, causes back reflectance and signal management problem

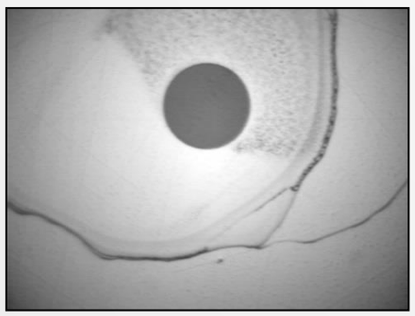
Causes of Signal Loss

Sources of Dust Contamination

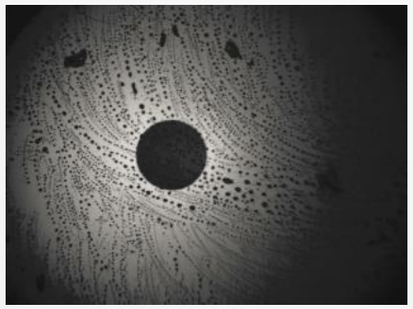
- Connector friction wear debris
- **Lint from paper wipes and cloth**
- Dead skin and hair
- **Outdoor activities generating particulate movements (dust & debris)**
- HVAC and equipment cooling fans
- ***Electrostatic charge***
- *Paper type cleaners use chemical binders*

Sources of Residue Contamination

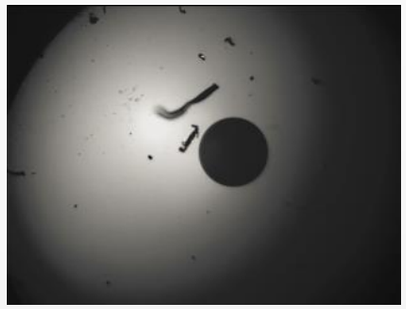
- ***Accidental contact with skin***
- IPA cleaning (IPA is Hygroscopic, absorbs atmosphere water and minerals, which get redeposited)
- ***Outgassing of connector end caps***
- Atmospheric humidity (water/minerals)
- **Coastal salt fog**



IPA Residue



Skin Oil



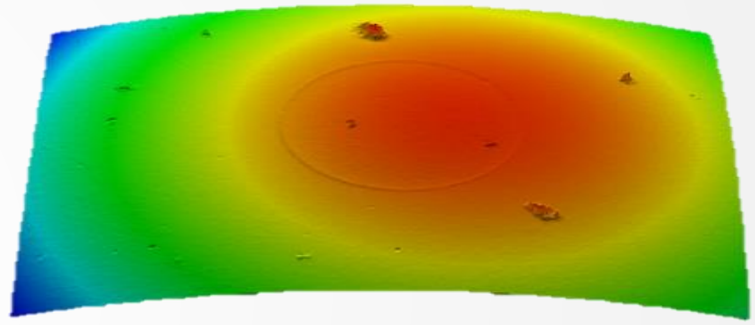
Lint

Dust

Connector Cleaning and Further Sources

Reason for Cleaning Connectors:

- Mating dirty connectors will cause scratching and pitting ruining termini end faces
- Cleaning both end of mated connector pair before mating will extend service life of assemblies and ensure reliability of signals



Common Sources of Contamination:

- Dust from environment
- Wear debris generated from moving parts when mating connectors
- Electrostatic charge caused by contact friction from dry cleaning processes
- Cross contaminated alcohol that has been diluted from atmospheric moisture, lint from paper based wipes, and broken cellular structure of foam tipped sticks

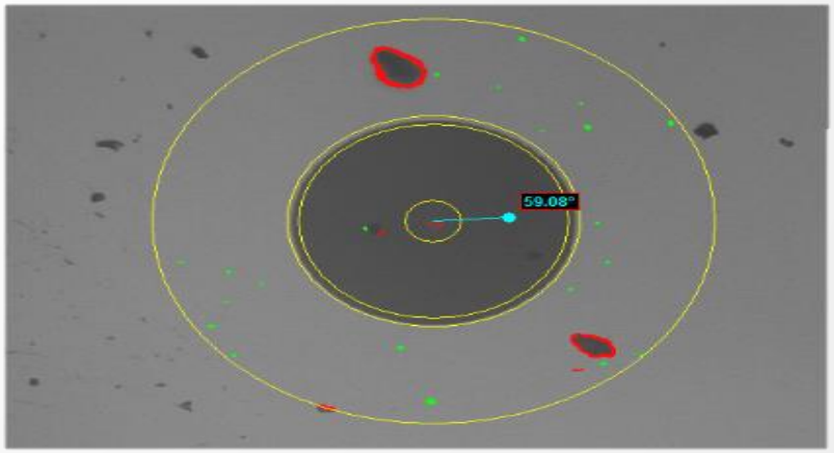
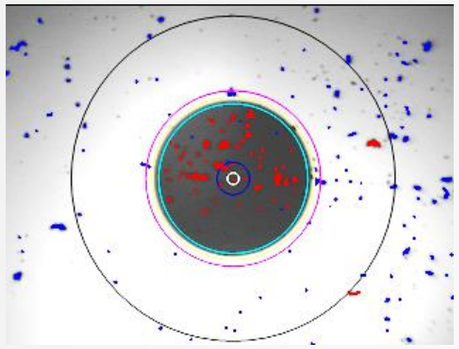


Image of dust contaminated end face courtesy of Promet Optics

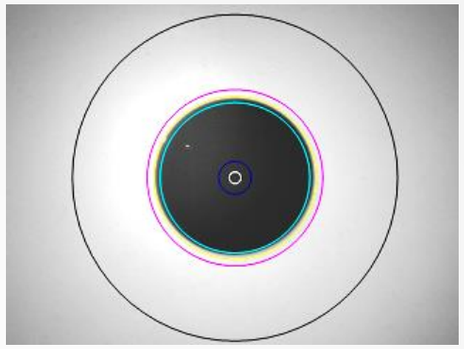
Inspect, Clean, Inspect – Why?

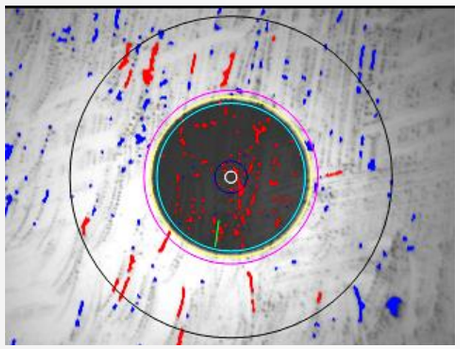
BEFORE CLEANING VIEW

POST CLEANING VIEW

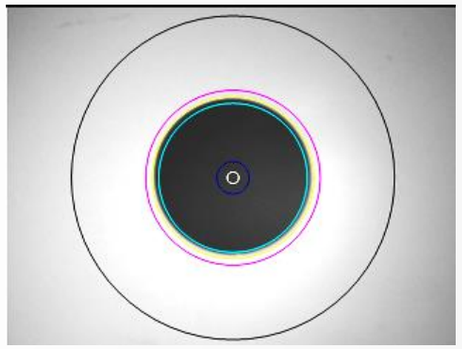


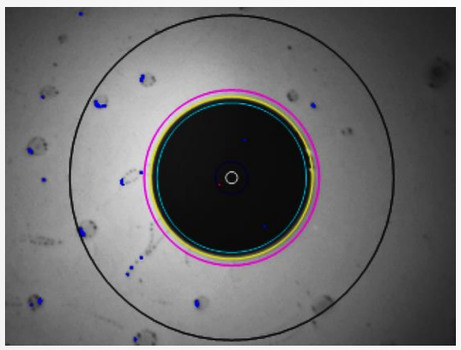
Dust debris



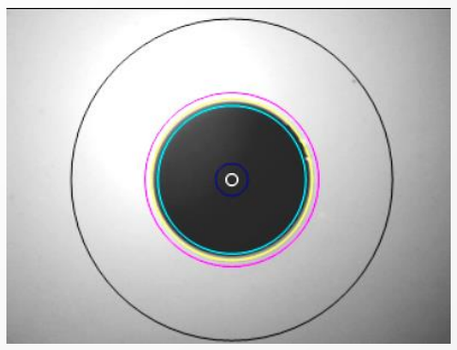


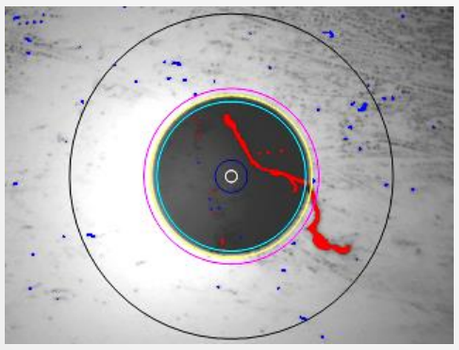
Finger oil – accidental touch



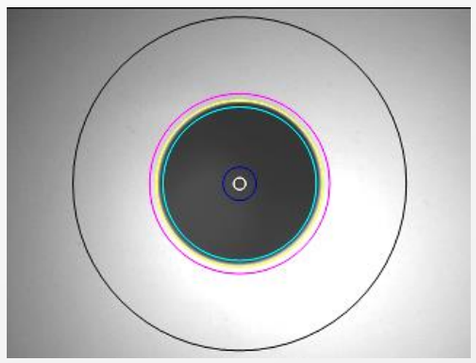


Mold release from caps, IPA cleaning residue

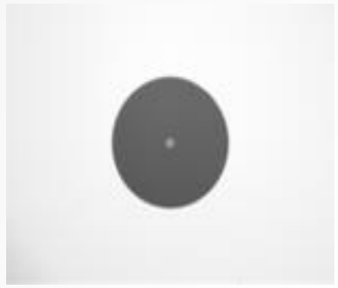
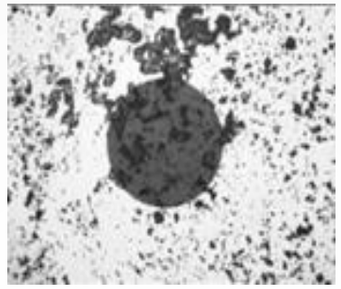
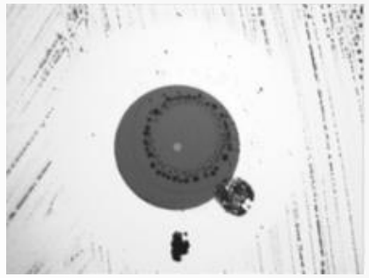
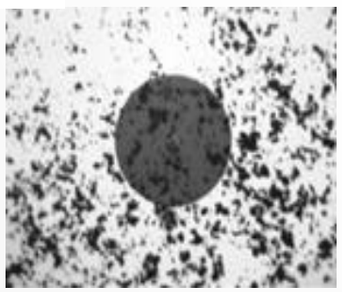
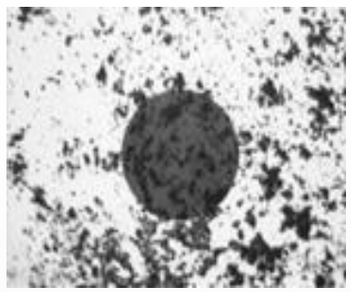
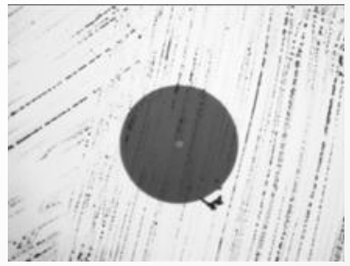


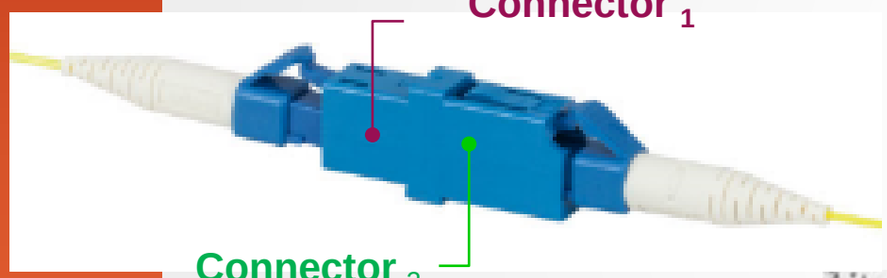


Remnants from a cotton shirt (Tech Cleaner)



One Connector is Clean, the Other is Not…

Before Mating	Dust Mating	Residue Mating	After Cleaning
			
Connector$_1$	Connector$_1$	Connector$_1$	Connector$_1$
			
Connector$_2$	Connector$_2$	Connector$_2$	Connector$_2$



- The dust or residue **transfers** on the 1st mating
- **Dust breaks apart** and **spreads** and embeds
- Both end faces now have **permanent damage** and need replacing

Sticklers

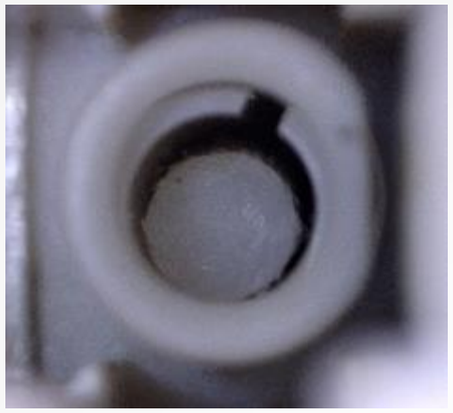
Sticklers® Product Line Review

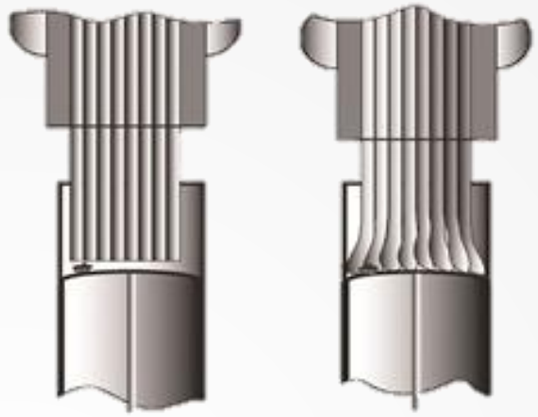
Fiber Optic Splice & Connector Fluid

- Use for cleaning bare fibers for fusion splicing and connector end-faces
- ***Rapid evaporation*** leaves no residues behind and prevents cross contamination
- Triton cap offers three ways for dispensing cleaning fluid on wipes, sticks, and flushing ports
- ***Hermetically sealed can*** prevent cross contamination and spills
- Product compliance to GHS, RoHS and REACH standard - non toxic chemistry and air ship safe
- Use of fluid creates ***electrostatic dissipative medium***

STICKLERS

CleanStixx™ Optical Grade Advantages





- Cleaning tip cleans the entire end face and contamination from the adapter sleeve
- Cleaning tip material has superior capillary action for wicking contamination away from ferrule end face, edge and chamfer
- Crimping of the cleaning tip allows it to retract into handle to prevent damage from excessive pressure and keeps tip off surface
- When used with the cleaning fluid, it creates a dissipative medium for eliminating electrostatic charge

P/N	Ferrule Type	Color Code	Applications
S12	Ø1.25mm	Green	LC, MU, ODC/RDC socket
S25	Ø2.5mm	Blue	SC, ST, FC, OptiTap, MIL 83526 (TFOCA) socket
P25	Pin Termini	Yellow	MIL 29504 pin termini, ODC/RDC pin termini, E2000
S16	Mil-Aero	Orange	M28876, M3899, & M29504 socket
XMT	MT	Pink	MT, MPO/MTP, Optitip/HFMOC
EB12	Ø1.2mm	Purple	M38999 1.2mm expanded beam termini

STICKLERS™

Jack Cleaning Recommendation

Sticklers™ Part Number	Description
MCC-S25	2.5mm CLEANSTIXX™ Cleaning Sticks
MCC-POC03M	Fiber Optic Splice & Connector Cleaner™ Cleaning Fluid

Advantages of Wet-Dry Cleaning using a stick cleaner

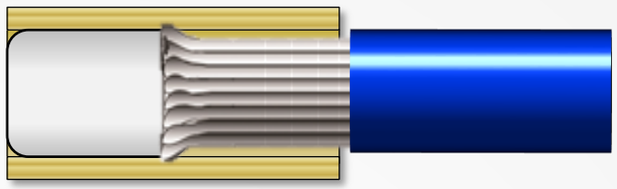
- The combination of the cleaning fluid plus the stick breaking up contamination and eliminate electrostatic charge

- Stick provides the largest cleaning area which prevents particle migration and pulls off dust from the jack's sidewalls

Cleaning Tips:

- Tilt can slightly when dispensing fluid
- Gently push cap – a little fluid goes a long way

Step 1: Insert the cleaning stick in the side port for the cap of the cleaning fluid



Step 2: Insert the stick into the jack and rotate the cleaning stick 6 to 8 times in the same direction

Plug Cleaning Recommendation

Sticklers™ Part Number	Description
MCC-P25	Pin CLEANSTIXX™ Cleaning Sticks
MCC-POC03M	Fiber Optic Splice & Connector Cleaner™ Cleaning Fluid

Advantages of Wet-Dry Cleaning Using a Stick Cleaner

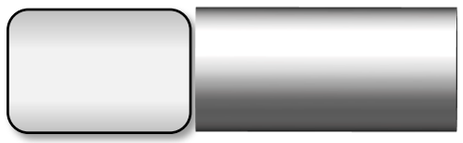
- The combination of the cleaning fluid plus the stick breaking up contamination and eliminate electrostatic charge

- Stick provides the largest cleaning area which can get to the ferrule edge and chamfer

Cleaning Tips:

- Tilt can slightly when dispensing fluid
- Gently push cap – a little fluid goes a long way

Step 1: Insert the cleaning stick in the side port for the cap of the cleaning fluid



Step 2: Place the stick over the ferrule and rotate the cleaning stick 6 to 8 times in the same direction

STICKLERS

CleanClicker™ - Mechanical

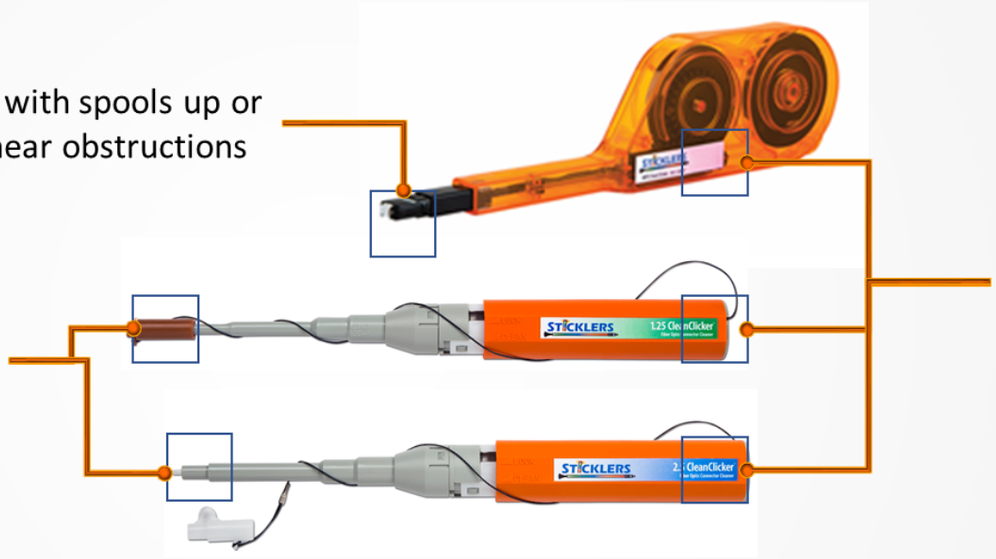
Where is this product used and what does it do?

- Used by technicians for cleaning fiber optic connectors and transceivers in OSP and premises networks
- Self aligning tool for wiping away end face contaminates from the contact zone of an optical connector pair
- Remove cap to clean in adapter connectors and transceiver ports and open lid of end cap for cleaning unmated assemblies

DIFFERENTIATING PRODUCT FEATURES

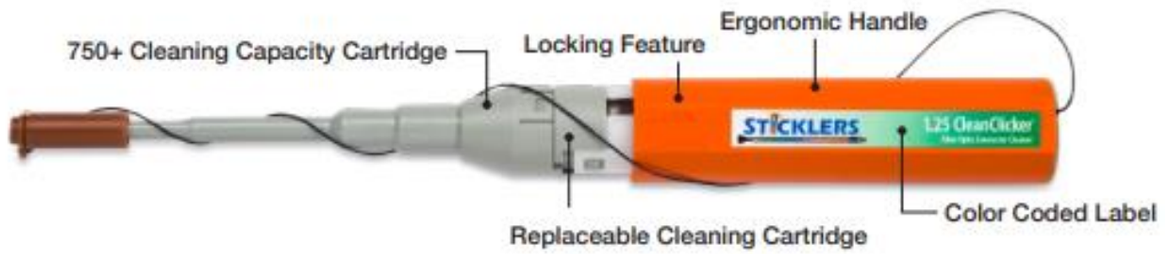
Keyless MPO cleaning tip
- Enable operator to insert clicker with spools up or down for accessing connectors near obstructions
- 600 clean end faces per unit

Cleanclicker 1.25mm & 2.5mm versions
- Replacement cartridge reduces costs
- Helical design
- 750 clean end faces per unit



Color coded handles
- Based on ferrule size
- Easy identification

Blue = 2.5mm
Green = 1.25mm
Pink = MPO

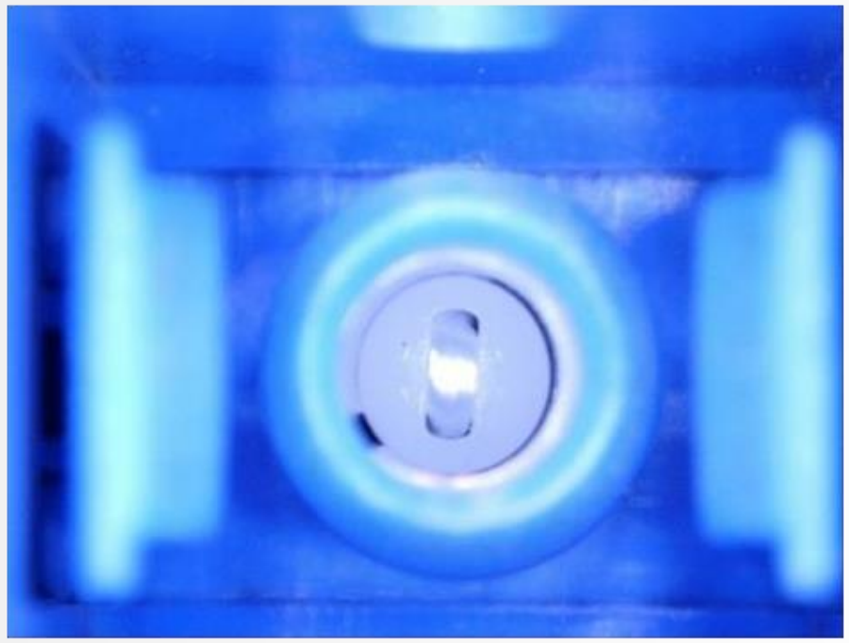


2.5 CleanClicker™ 750

Refill Cartridge

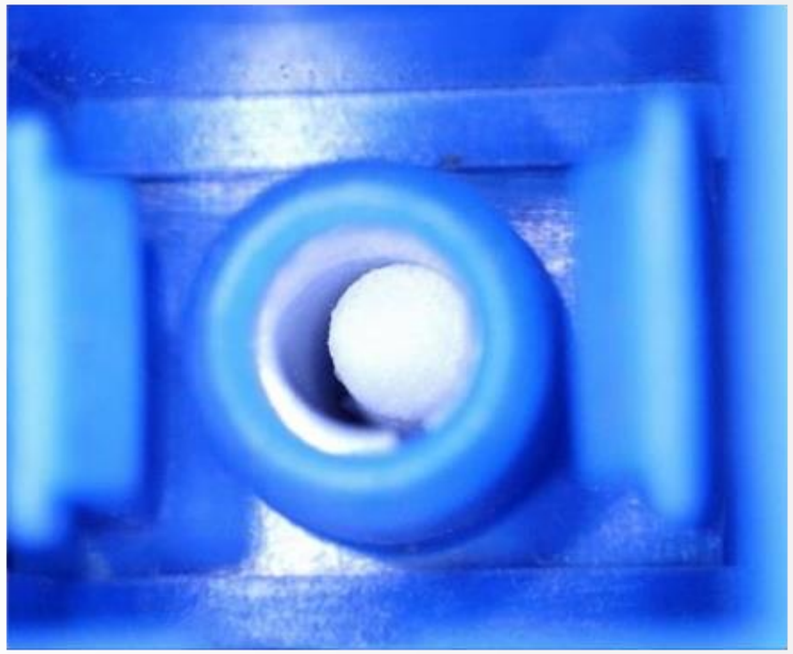
CleanClicker™ VS CleanStixx™

Clicker in an Adapter



- Clickers are good for rapid cleaning with light levels of contamination
- Clickers provide consistency for wiping in the contact region

Stick in an Adapter



- Sticks have a larger effective cleaning region
- Sticks pull contaminates from the sidewall of adapter sleeve
- Sticks are best for heavy levels of contamination

CLEANWIPES™ Optical grade

Where is this product used and what does it do?

- Used in OSP locations as well as central offices and head ends where there are connectors and fusion splicing
- Cleans fibres after stripping & perp for fusions splicing
- Cleans connector end faces of cable assemblies including jumpers, trunks, and drops

DIFFERENTIATING PRODUCT FEATURES

All wipes are true optical grade wipes

- Highly absorbent material is safe for dry cleaning and for wet –to-dry cleaning end faces
- Manufactured using high-sheer strength materials that resists generating lint

Dissipative packaging to prevent static charge based dust contamination

Individual hermetically sealed dry wipe

Plastic packaging protects wipes from the elements and crushing in the field

Hexagon cap prevents tub from rolling away when dropped

MLCW for Surface Cleaning / virus removal

STICKLERS™

CleanClicker™ Cassette

Where is this product used and what does it do?

- This is a second generation cassette cleaner to replace the first generation cassettes
- Used by technicians for cleaning fiber optic connector end faces on unmated cable assemblies
- The manual advancement lets the operator decide when to get a new section of ribbon which improves the cleaning efficiency

DIFFERENTIATING PRODUCT FEATURES

Microwoven Fiber Cleaning Ribbon

- Ultrasonically cut ribbon prevents loose fibres
- High sheer strength prevents fraying during wipe process

Open Cleaning Ribbon

- Edge cover is made of static dissipative material to prevent electrostatic charging
- Easy to add cleaning fluid for wet-dry cleaning
- Easy access for cleaning LC & SC duplex and female MPO connectors

Field Inspection and Clean Kits

… Several variation of kits

Inspection & Clean Kits

Solving the Problem

Sticklers Fiber Cleaning Products - Summary

- Kits are ideal for field installation projects and contain all categories of products mentioned including back up
- Fluid cleans end-face / bare fiber and dissipates static matches up with wipes, clickers and stixx (Wet to Dry Cleaning)
- Mechanical CleanClickers are for bulkheads & patch cords, large volume or small, light to medium soil levels
- CleanWipes™ boxes ideal for splicing pigtails and patch cords, as well as ferrule core, edge and chamfer
- CleanStixx™ sticks prevent particle migration, clean the adapter sleeve, dissipate electrostatic charge, and heavy soils

What makes Sticklers different

- Using optical grade products enables you do the job right the first time
- Fast evaporation and no residues of the Fiber Optic Splice & Connector Cleaner™ fluid prevents cross contamination and eliminates ESD
- The single fiber CleanClicker™ 750 cleaners are refillable for lowering the cost per clean and self aligning for consistent quality performance for cleaning assemblies and in adapter connectors

STICKLERS

Understanding Cleaning Process and Time

Focus on <u>Doing the Job Right the First Time</u>

- Investing quality cleaning products enables operators to be more effective and efficient
- Profits are reduced and time is lost when a technician has to go back to the site to troubleshoot and correct a problem
- If you did not have time to do it right the first time, do you have the time to fix it?