PRO 360° ™
TOUCHLESS CLEANER

Achieving Precision Cleaning with the Sticklers™ Pro360°™ Touchless Cleaner: A Three-Year Study on Dust and Oil Removal

Introduction

Cleaning fiber optic end face connections is a critical process that often requires precision, efficiency, and repeatability to ensure uninterrupted network connectivity and top-speed performance. Contamination blocks the light flow through the fiber and can cause back-reflection (the signal is diverted back to its source) or insertion loss (a weakened signal). If contamination is present, the signal path, or refraction angle, can change enough that the signal is completely lost.

The Sticklers™ Pro360°™, an innovative cleaning technology, has gained industry attention for its remarkable ability to remove dust and oil residues from end faces. In this article, we present the results of a three-year study conducted by the MicroCare Critical Cleaning Lab to evaluate the *Pro360°* performance in achieving exceptionally clean end faces, focusing on its cleaning process, success rate, visual outcomes, and the key benefits the *Pro360°* has to offer.

The Sticklers™ Pro360°™ Technology

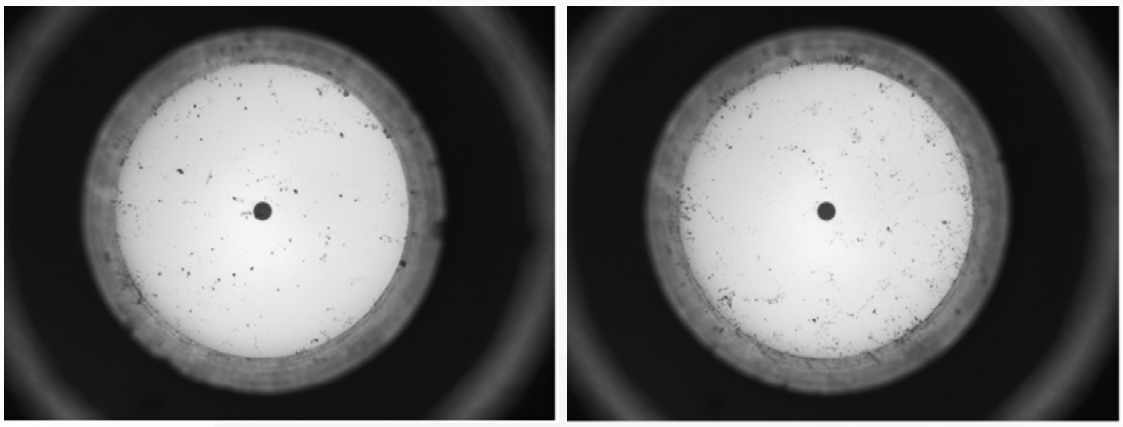
The *Pro360°* utilizes a groundbreaking technology using Coandă Effect fluid flow to achieve its remarkable cleaning capabilities. The Coandă Effect is a principle of fluid dynamics where a high-velocity fluid flow can be manipulated by surface drag to establish a pressure difference between the jet flow and its surroundings. This unique fluid flow technology allows the *Pro360°* to create a powerful and precisely controlled airflow, ensuring effective dust and oil removal across the entire surface of a connector endface.

Test Parameters

For the three-year study, the Critical Cleaning Lab established specific test parameters to evaluate the *Pro360°* cleaning performance in removing dust and oil as compared to current cleaning methods. The study spanned approximately three years to ensure a comprehensive evaluation of the *Pro360°*'s long-term performance.

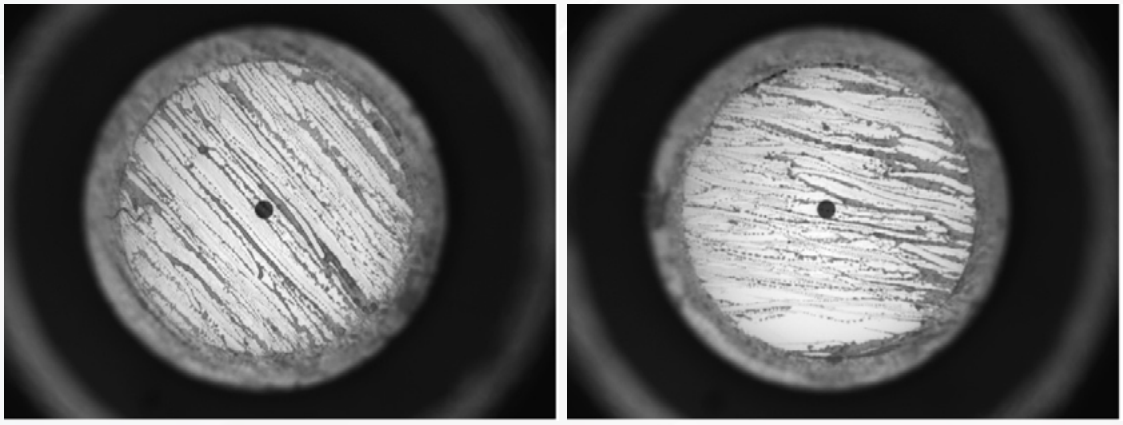
Over this period, the *Pro360°* demonstrated consistent cleaning efficacy, even in environments with changing conditions and connectors with varying levels of contamination. The Critical Cleaning Lab study involved rigorous testing and thousands of test trials with the following parameters:

Dust: Fiber optic end faces were contaminated with varying levels of lab-generated dust, including fine particulate matter, in a controlled environment.



Examples of Dust Contamination

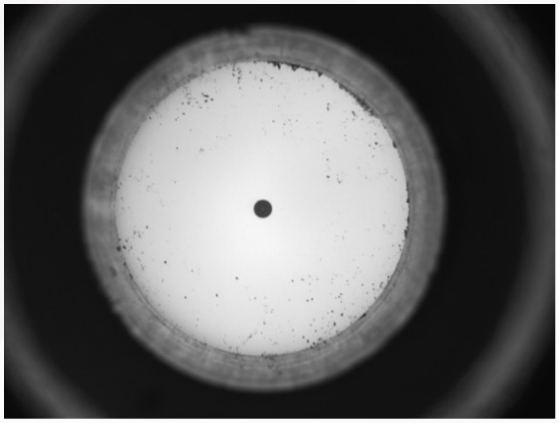
Oil: Oily residues, of several types and viscosities were generated in our lab and applied to end faces to assess the *Pro360º*'s ability to remove oil effectively.



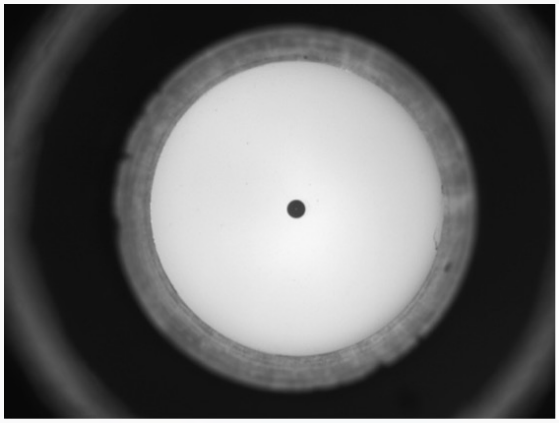
Examples of Oil Contamination

Click-to-Clean Tool Cleaning Results Comparison

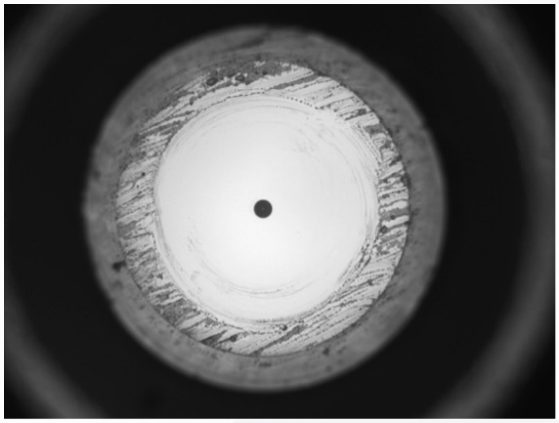
Click-to-Clean Tools are popular and effective end face cleaning tools. However, the *Pro360º* cleans not only around the core, but extends its cleaning action to the chamfer, providing a more comprehensive cleaning solution. The *Pro360º* minimizes the risk of dust and oil contaminants migrating back into the core, preserving signal integrity. Notice the Click-to-clean images below leave contamination outside the core.



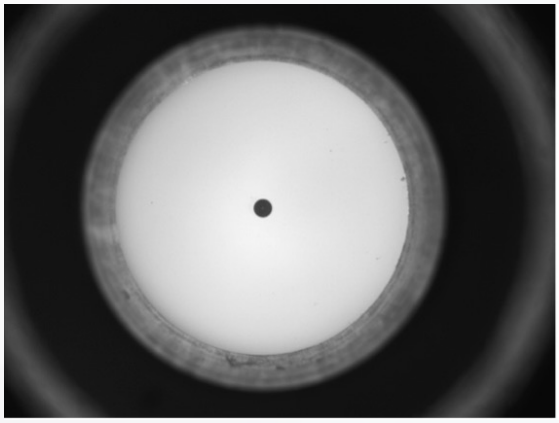
Click-to-Clean Tool leaves trace dust contaminants



Pro360º cleans to the chamfer, beyond the core



Click-to Clean Tool leaves residual oil



Pro360º thoroughly cleans all the way to the ferrule edge

Initial Testing Equipment and Standards

Fiber optic end face cleanliness testing was performed to more stringent criteria than IEC-61300-3-35 Ed. 2.0 specifications using Viavi inspection microscopes FVDi-2080 and FVAi-2030 models.

- Data collected with 1.25mm LC patch cables using the Viavi FVDi-2080 microscope with FMA-LC adapter fitting.
- The trials were performed for each contaminant with three specific cleaning methods and "Average Cleans to Pass" were calculated using passing results as determined by inspection scope software calibrated beyond the IEC inspection standard. IEC Standard focuses within the core regions whereas the inspection we used focused all the way to the chamfer.
- "Perfectly Clean" denotes end faces that successfully "pass" cleaning requirements per inspection scope software test parameters, and visually demonstrate contamination has been completely removed all the way to the endface edge and chamfer, see photos for examples.

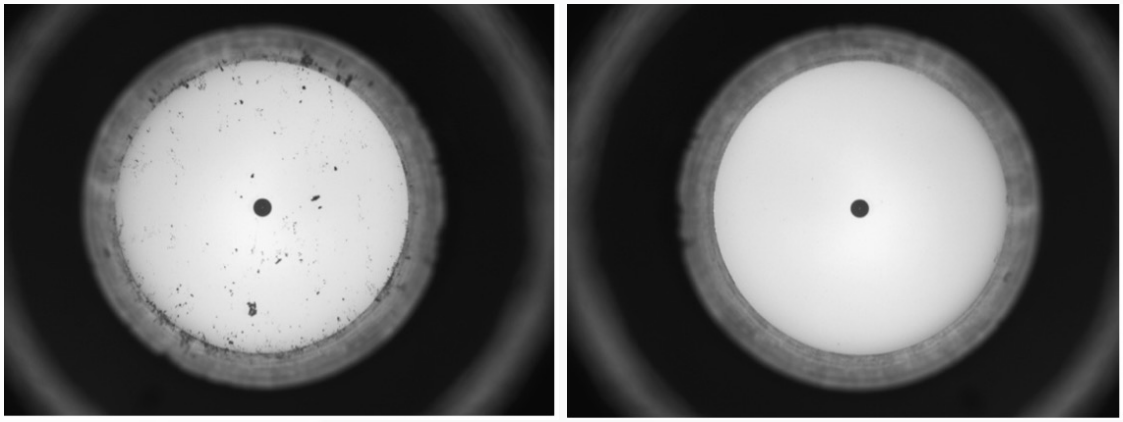
1.25mm Male Cleaning Data Table

CONTAMINANT	METHOD	AVERAGE CLEANS TO PASS	CLEAN ACROSS END FACE	SCRATCHES/ STATIC BUILDUP
Dust	MCC CCU125	2.9	No	Yes
Dust	Comp. Clicker	3.1	No	Yes
Dust	*Pro360°*	1.1	Yes	No
Artificial Sebum	MCC CCU125	1.1	No	No
Artificial Sebum	Comp. Clicker	1.1	No	No
Artificial Sebum	*Pro360°*	1.8	Yes	No

Artificial sebum is a standard mixture of plant-based oils, wax, cholesterol, triglycerides and organic acids that is meant to closely simulate human skin oil.

Dust Testing

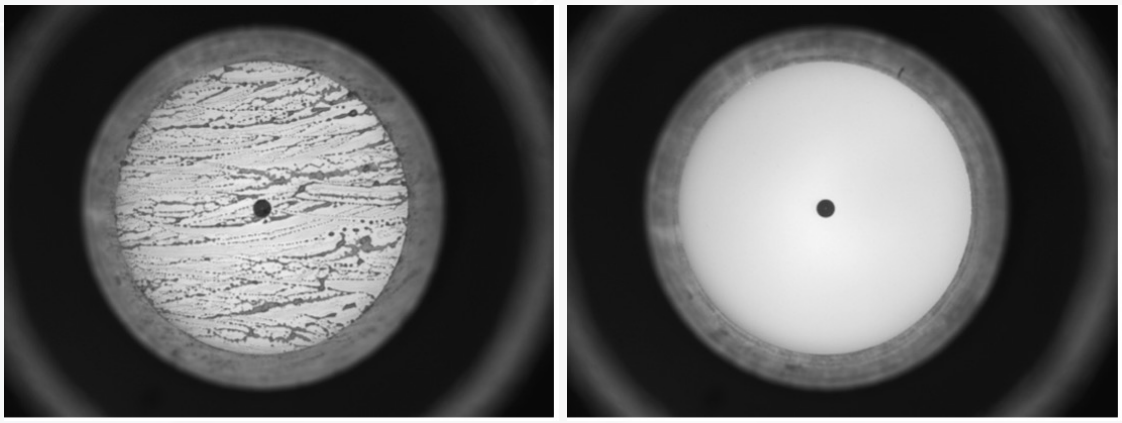
- **LC/UPC:** On average 93% passed inspection after one cleaning cycle, most passed inspection after two cleaning cycles.
- **SC/UPC:** On average 90% passed inspection after one cleaning cycle, most passed inspection after two cleaning cycles.



Dust Contamination Before and After Cleaning with the *Pro360°*

Oil Testing

- **LC/UPC:** On average 90% passed inspection after two cleaning cycles.
- **SC/UPC:** On average 86% passed inspection after two cleaning cycles.



Oil Contamination Before and After Cleaning with the *Pro360º*

Visual Results

One of the most striking features of the *Pro360º* is its ability to clean end faces to the ferrule edge with remarkable precision. The Coandă Effect ensures that the cleaning jet remains directed towards the intended cleaning area, resulting in proper dispersion of cleaning agents.

Because of limitations inherent to mechanical "clickers" cleaning a convex shaped endface, IEC-61300-3-35 will "pass" an endface that has contamination found in areas outside of the central core contact zone of a connector endface. Depending on contamination size and location, the software will analyze and "pass" an endface with contamination visually evident on an endface. The visual results obtained through the *Pro360º* inspections after cleaning were consistently impressive. Not only does the cleaning process consistently "pass" using software analysis on the first clean, but the technology effectively removes dust and oil leaving the full surface of an endface in a pristine condition compared to most cleaning tools. The end face edge of components was consistently cleaned, ensuring that no contaminants were left behind. This level of precision is essential in industries where even the slightest residue can lead to performance issues or network downtime.

A New Fiber Optic End Face Cleanliness Testing Standard

No formal industry standards currently exist for the consistent and deliberate contamination of end faces in a reproducible manner. As leaders in the fiber cleanliness field, *Sticklers* and the MicroCare Critical Cleaning Lab established new test methods for defining common levels of performance for fiber cleanliness.

The test procedures for dust and oil developed by the Critical Cleaning Lab surpass the levels encountered by technicians in their everyday operations, ensuring a higher standard of achievement with the *Pro360º*. These procedures have been meticulously designed and refined, providing a comprehensive framework for evaluating and comparing the cleaning performance of fiber optic end face cleaners.

Future-Proofing Fiber Optic Cleaning

With the capacity to perform 2,100+ contactless cleans per no-spill, high-purity cleaning fluid canister, the *Pro360º* offers unmatched efficiency and productivity. The cleaning fluid is nonflammable and non-pressurized, ensuring safety, ease of use and transport. It boasts a low GWP (global warming potential) and contains no HFCs, aligning with evolving environmental standards and regulations.

As a result, the *Pro360º* cleaning fluid paves the way for compliant fiber optic cleaning practices well into the future.

Comparative Cleaning Costs

Even in the most challenging conditions, The *Pro360º* outperformed traditional cleaning methods including popular mechanical “click-to-clean” tools. Its precise Coandă Effect airflow allowed it to eliminate dust particles that would have otherwise remained on surfaces.

Other Benefits of the *Sticklers Pro360º* Touchless Cleaning Tool

- **Provides the Highest Standards of Cleanliness:** The *Pro360º* maintains high quality and repeatable cleaning outcomes, crucial for industries where even slight contamination can lead to network performance issues or end face defects.
- **Ensures a Fast Network without Signal Loss of Interruption:** The *Pro360º* contributes to the maintenance of a fast and reliable network, through a 1-time clean cycle. The industry average for technicians is 3+ "clicks" per connector.
- **Gets Cleaning Done Right the First Time:** The *Pro360º* ensures connections are consistently cleaned on the first attempt, saving both time and effort. It simplifies the cleaning process by having multiple connector size capability, improving overall cleaning success and operational efficiency.
- **Prevents Troubleshooting and Recleaning Connections:** The *Pro360º* minimizes the need for troubleshooting and the time-consuming process of recleaning connections, reducing potential network disruptions and associated costs. By cleaning the full endface, the chance for contamination vibrating from the sides is eliminated.
- **Reduces Expensive and Time-Consuming Callbacks:** The *Sticklers Pro360º* Touchless Cleaning Tool ensures connector cleanliness, minimizing the need for callbacks, saving both time and resources.

Conclusion

The *Sticklers Pro360º*, with its Coandă Effect fluid flow technology, is an invaluable tool for fiber optic end face cleaning. Over a three-year Critical Cleaning Lab study, it consistently demonstrated its ability to remove dust and oil contaminants with a success rate exceeding 93% for dust and up to 90% for oil with one clean cycle. These percentages will be much higher if we only tested to the IEC 61300-3-35 standard. The remarkable precision of the Pro360º, ensuring full end face cleaning to the ferrule edge, makes it a trusted solution for users where cleanliness is of utmost importance.

As the *Pro360º* continues to be adopted into the fiber optic cleaning market, it stands as a testament to the innovative potential of Coandă Effect fluid flow technology in end face cleaning. Its consistent and reliable performance positions it as a transformative tool for those seeking the highest standards in cleanliness and end face quality.

Patents Pending

The *Sticklers Pro360º* is an innovative technology with multiple patents pending in the USA and global markets.

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