



Overview of IonField's Products and Plasma Cleaning Technology



About IonField Systems

We focus on technology for a more sustainable future. Our products clean plastic labware for extended reuse; specifically Pipette Tips and Microplates.

IonField has solutions for key problems our customers face:

1. How to Protect against shortages
2. How to Reduce their carbon footprint and environmental waste stream
3. Capture opportunities for ongoing savings





Overview of IonField System Products and Plasma Cleaning Technology

PurePLATE Solutions: MCS and Max



Microplate Cleaning Solutions

PurePLATE is a state-of-the-art **standalone solution** that enables the re-use of microplates

- The MCS is 100% digital.
- A convenient, modular solution.
- Easy to integrate with robotics.
- Included API and Networking Hardware.
- Can be stacked.

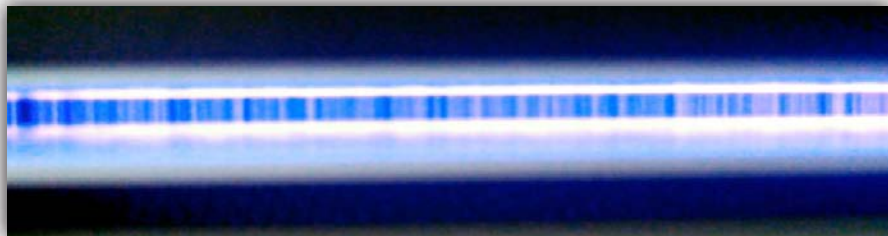




Exceptional Cleaning

Plasma Cleaning is Different

- PurePlate MCS uses a combination of liquid wash and cold-plasma exposure to clean used assay plates.
- Cold-plasma technology converts room air into a cool plasma. The energy in plasma “air” attacks the material on the plates and triggers a near instantaneous oxidation.
- It is generated by electron streamers that fire off the surface of a dielectric barrier and ionize the air and any water vapor.
- Material is eliminated in and around the wells of the plate.



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Proven in Pharma and Biotech labs to completely remove:

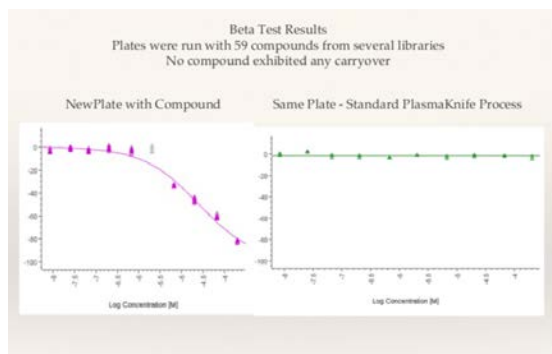
- ✓ DNA, RNA, siRNA, mRNA, and other genomic material
- ✓ Small molecules in DMSO
- ✓ Proteins, enzymes and any other biomolecule
- ✓ Complete organisms, viruses, subviral particles
- ✓ Ag genomic and other samples may need pre-wash

For **more stubborn material on the plates** and applications using formalin fixing of cells (especially cell painting), we can increase the intensity of our micro dispense head rinse step in the cleaning process, which has proven to be very effective!

Our Process is the Gold Standard

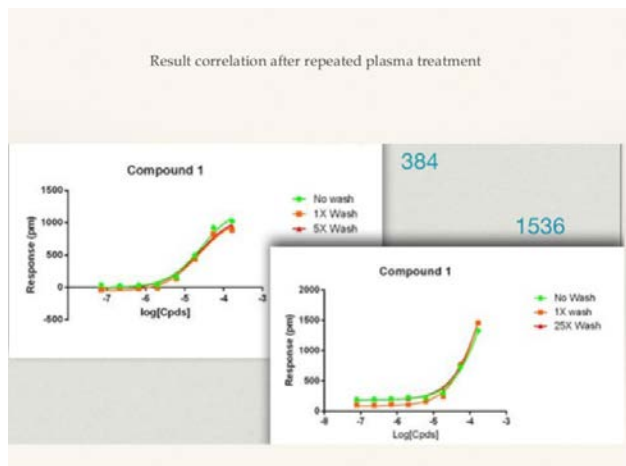
- PCR-clean and sterile.
- Plates are ready for immediate reuse.
- The plasma cleaning process is solvent and waste free.

Exceptional Cleaning

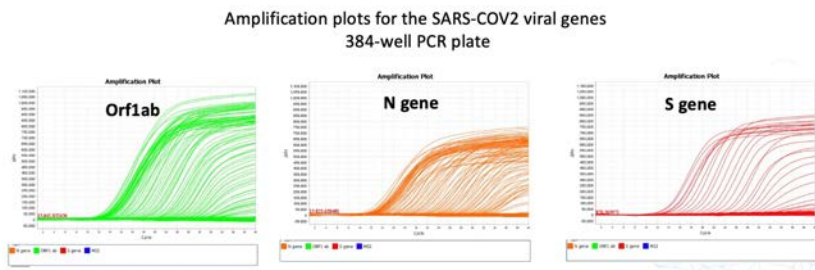


59 compounds tested.
No carry-over.

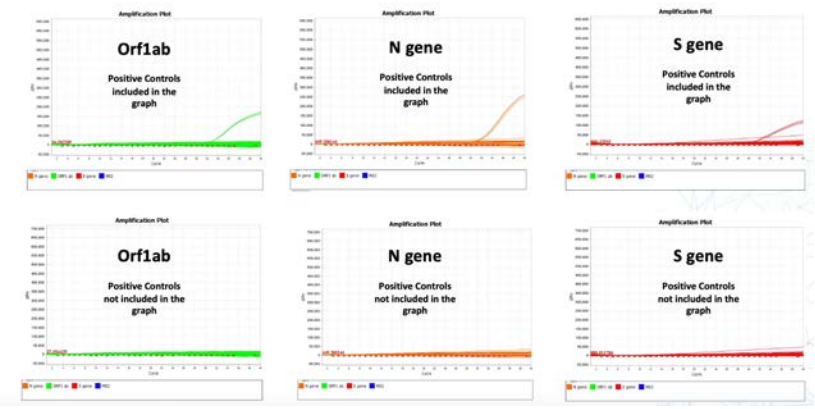
There is no known limit for the # of re-uses possible for microplates.



RESULTS: **BEFORE** Plasma cleaning



RESULTS: **AFTER** Plasma cleaning



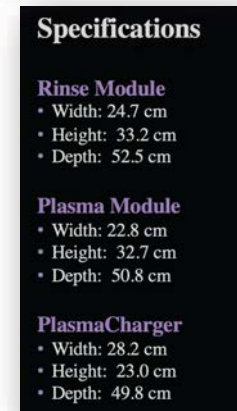
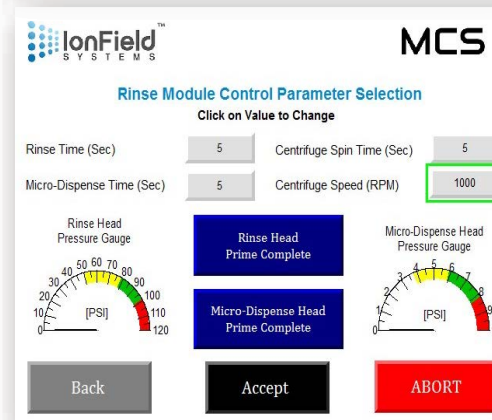
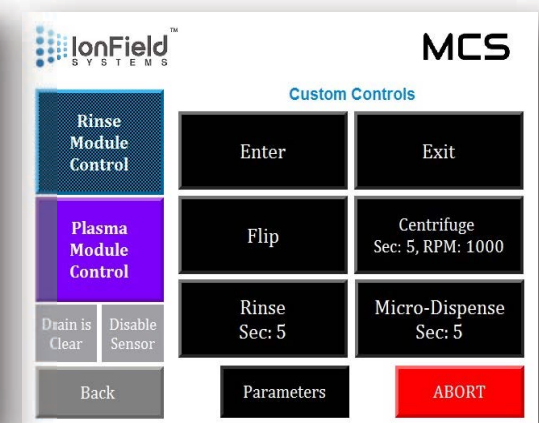
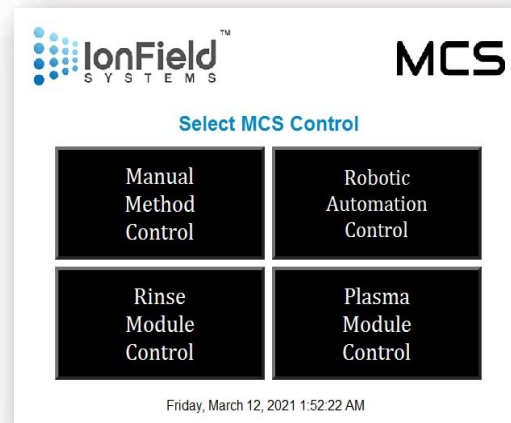
There was no viral gene detected in the wells .

Easy to Use & Operationalize

To run a pre-programmed method:

1. Go to the HMI, select method, start cleaning.
 2. Load the plates into PurePLATE
 3. The PurePLATE centrifuges at 1500 rpm to spin out the contents in each well, runs a HP rinse, spins, runs a micro dispense wash, spins again, and returns the microplate to lab operator.
 4. Transfer the plate to the Plasma Module
 5. On the touchscreen initiate the plasma. Plasma sweeps over the plate for 30s.
 6. The Microplate is returned ready for immediate re-use.
- The whole process takes just **60 seconds!**

PurePlate MCS cleans 50-55 plates / hour.





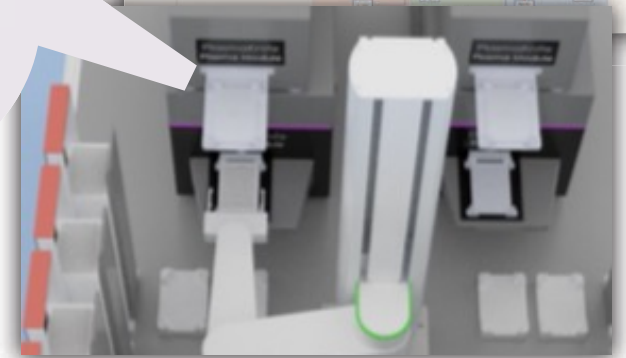
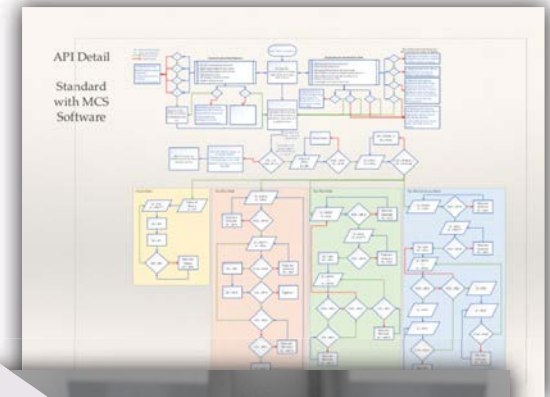
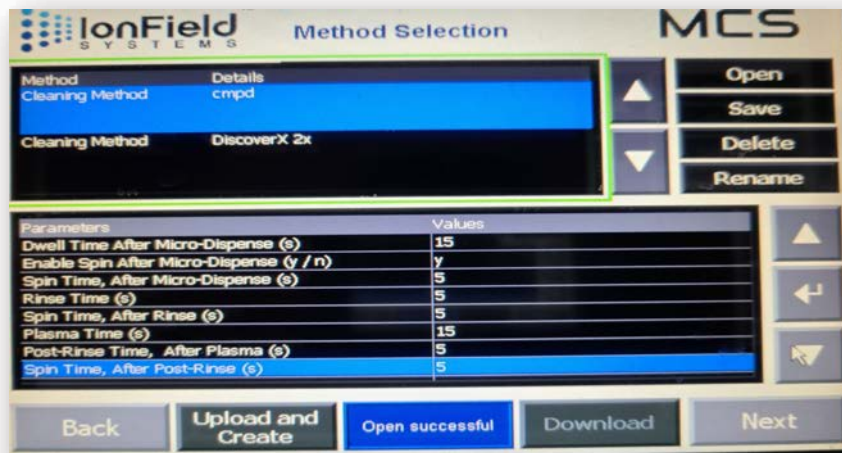
Versatile & Scalable

“A One Size Fits All” Microplate Cleaner

- Any microplate with a standard SBS footprint, 44 mm or thinner, or semi-skirted, in any hole format can be cleaned, including acoustic source plates.

Intuitive Software

- Programmable parameters that adapt to your cleaning requirements



Easy to Integrate

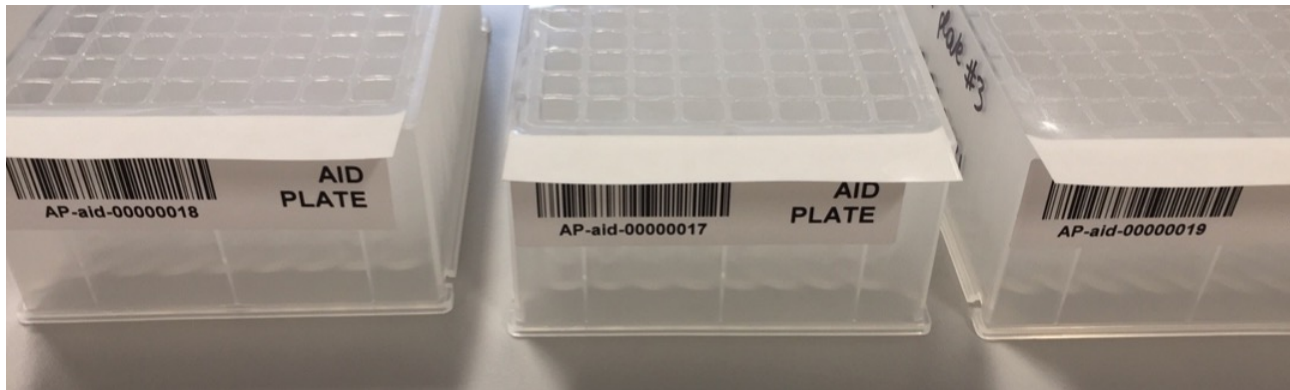
- Integrated API commands are in the standard software.
- Open API allows PurePLATE to integrate with any robotic solution.
- Our integrated, automated solution is PurePLATE Max in partnership with Lab Services.
- PurePlate Max uses 2 PurePLATEs to maximize microplate cleaning capabilities for high-thruput labs.

Video of the PurePLATE Max is on the IFS website.



And Trackable!

- Plasma cleaning does not remove or smear barcodes and works with RFID tags



- IonField is partnering with Computype to provide Virtual Barcode™ technology add capabilities including **inventory tracking, managing reordering, and other logistical functions** that can be customized to your exact needs.



Eco-friendly, Cost-effectively Supported

IonField's Approach to Customer Success

- Use of Virtual Headset Technology
 - *Engineers support customers using virtual headset technology.*
 - *Hands-free headsets allows our customer success team to support customers globally and quickly.*
- We offer support services well below the industry standard.
- Real-time, remote support saves organizations valuable time and resources by allowing them to:
 - *Troubleshoot Anywhere*
 - *Minimize Equipment Downtime*
 - *Elevate Support with Intelligent Conferencing Tools*
 - *Communicate Globally with Translation Services*



Designed to Meet User Needs

- Ships complete and ready to install.
- PurePlate MCS was designed to be self-maintained and services. A screwdriver is all it takes!
- A majority of maintenance or repair issues can be supported remotely by IonField in under 30 min.
- Delivered with a detailed user guide to make installation easy and virtual.
- Web-based software allows us to track any of your needs and address quickly.

PurePLATE - In Summary

- **Effective.** PurePLATE MCS uses a combination of liquid wash and cold-plasma exposure to clean used assay plates.
- **Versatile.** Any microplates with a standard SBS footprint up to 44 mm can be cleaned and it works with all commonly used screening and optical microplates.
- **Fast.** PurePLATE MCS can clean 50-55 plates / hour.
- **Easy.** Designed to be user maintained. Most maintenance or repair issues can be supported remotely by IonField and fixed in under 30 min.
- **Smart.** Components are modular and self-monitoring and software is very intuitive:
 - Adapts to your cleaning requirements
 - Integrated API commands are in the standard software
- **Ready.** Power up, prime and be operational in less than 5 minutes.
- **Sustainable.** Fewer microplates used creates a greener footprint for laboratories (LCA available)
- **Economic.** Per plate processing costs are about £0.78 each.

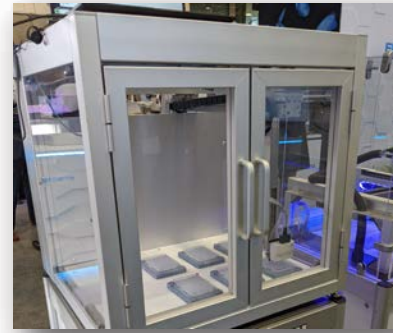


Overview of IonField System Products and Plasma Cleaning Technology

PureTIP Solutions: Standalone and Companion Products



IonField Systems Tip Cleaning Solutions



Pipette Liquid Handler Companion (LHC) System

Our most market tested, “on deck” solution

- Compatible with a majority of liquid handler brands
- 96 and 384 channels used to clean pipette tips
- 384 and 1536 used to clean pin tool

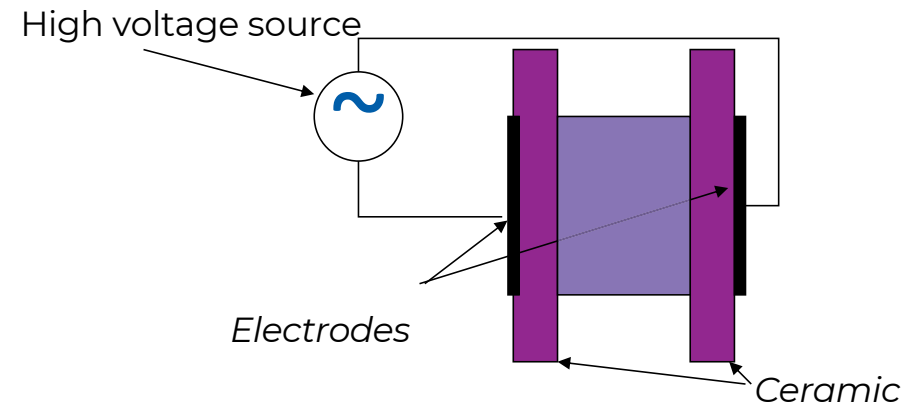
PureTIP Plus Standalone System – Coming Soon

Our most versatile, “off deck” tip cleaning solution originally designed to clean the pipette tips commonly used in Covid-19 screening

- For Filter and Non-Filter Tips
- Conductive or Non-conductive

How We Make Plasma

- All IonField products include the PlasmaCharger.
- The PlasmaCharger provides precisely controlled high voltage, high frequency, low amperage power to two ceramic covered electrodes producing micro-discharges.
- These micro-discharges create plasma as air flows through the gap.
- Byproducts of plasma are ozone, hydroxide, and activated nitrogen species.





Exceptional Pipette Tip Cleaning

Proven to completely remove:

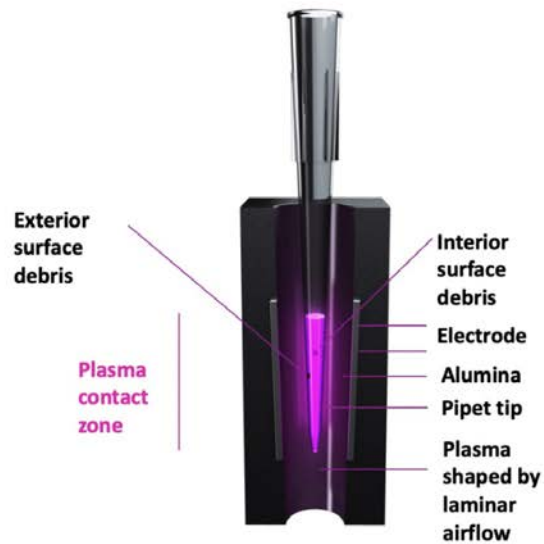
- ✓ DNA, RNA, siRNA, mRNA – to PCR Clean
- ✓ Macromolecules - Proteins, carbohydrates, etc.
- ✓ Complexes of macromolecules, eg. Immunoglobulins
- ✓ Low molecular weight compounds in DMSO
- ✓ Cells, viruses, and sub-viral particles



PureTIP Technology Cleaning Processes

PureTIP LHC Cleaning Process

- Pipette tips are lowered into the electron streamers and plasma.
- Then plasma is aspirated then dispensed 6 to 8 cycles. Plasma intensity increases with each cycle.



PureTIP Plus SaS Cleaning Process

- Pipette tips are lowered into the plasma gas.
- Then plasma is pulled through the tip and filter continuously.
- Maximum plasma intensity is achieved in **a few seconds**.



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Side-by-Side

	PureTIP LHC (On Deck)	PureTIP Plus SaS (Standalone System)
Warranty	6 Months	12 months
Availability	Delivery ~8 weeks	Q4 2024
Plasma Cleaning	Standard Process – lowered into the plasma then 6-8 mix cycles are run, plasma intensity increases with each cycle	Continuous Pull (up to 1000X more powerful than mixing) – plasma is pulled up through the tip and filter. Max plasma intensity achieved in ~2 seconds
Tip Volume	Cleans 20uL – 300uL	Cleans 20uL – 1mL
Filtered Tips	PureTip LHC product mounts on a liquid handler deck.. A lab needs the new PureTip Plus cleaning product if filter cleaning is a requirement.	Cleans Conductive/standard, filtered/non-filtered, racked 96 format pipet tips. Customers cleaning tips used in qPCR or for NGS need the new PureTip Plus SaS. The continuous plasma cleaning process of the SaS will reach background (PCR Clean) for these methods.
Cleaning Time	Avg. 30 seconds / rack	Cleans tips @ 30 to 60 racks/hour The exact number of seconds would require a calibration effort prior to the application
End User Experience	No API or interface	Includes API and Networking Hardware. Design includes HMI Touchscreen



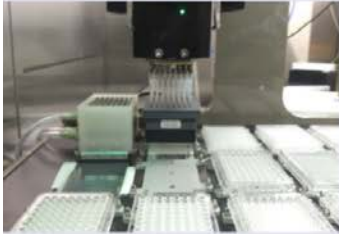
PureTIP LHC: Easy to Operate

- Typical operation is for the liquid handler to lower a rack of pipette tips into the PureTip LHC cleaning station for approximately 30 seconds of direct plasma exposure.
- The cleaning station turns on when the tips break a light beam and goes off when the tips are raised.
- After treatment, tips are ready for immediate re-use.
- While the plastic tips are in the cleaning station, the liquid handler is programmed to run a standard mix, pulling plasma into the pipet tip and then expelling the waste gas.
- Typically, 6 or 7 cycles are programmed in the mix step.





Works with virtually all liquid handlers using low volume tips.



Canadian-based Drug Discovery Lab Using a Dynamic Devices Liquid Handler.



Ag Genomics Application at a Canadian Laboratory Using a Tecan Liquid Handler.



European-based Laboratory Working in Human Genomics Using a Hamilton Liquid Handler. PureTIP Customized with 1/2 Height Base.



Ag Genomics Application at a Canadian Laboratory Using a Beckman Liquid Handler.



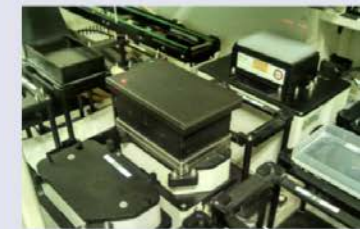
EU-based Human Genomics Lab.



US Government Laboratory using Hamamatsu FDSS.

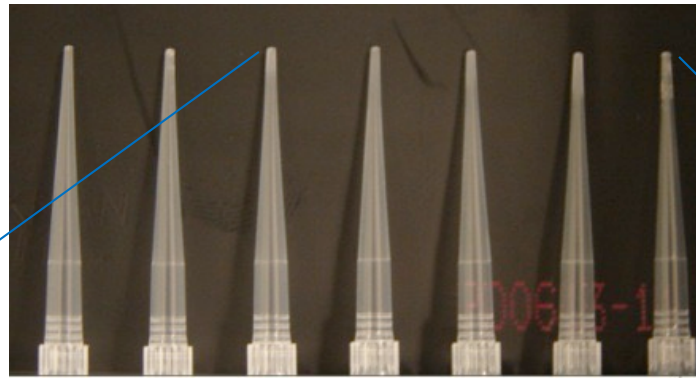


Drug Discovery at a Global, US-based Pharmaceutical Company.

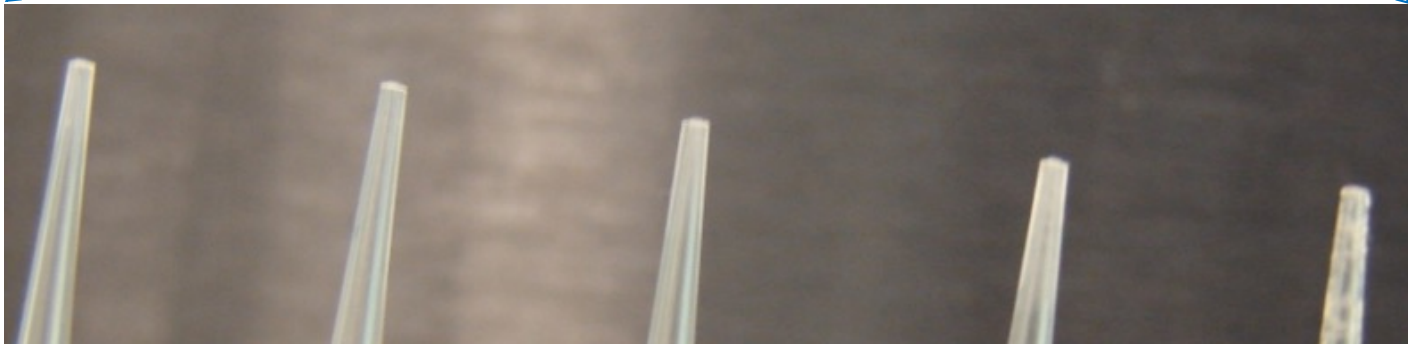


Drug Discovery Lab at a Global Pharmaceutical Company Headquartered in Japan.

Tips after 50 cycles



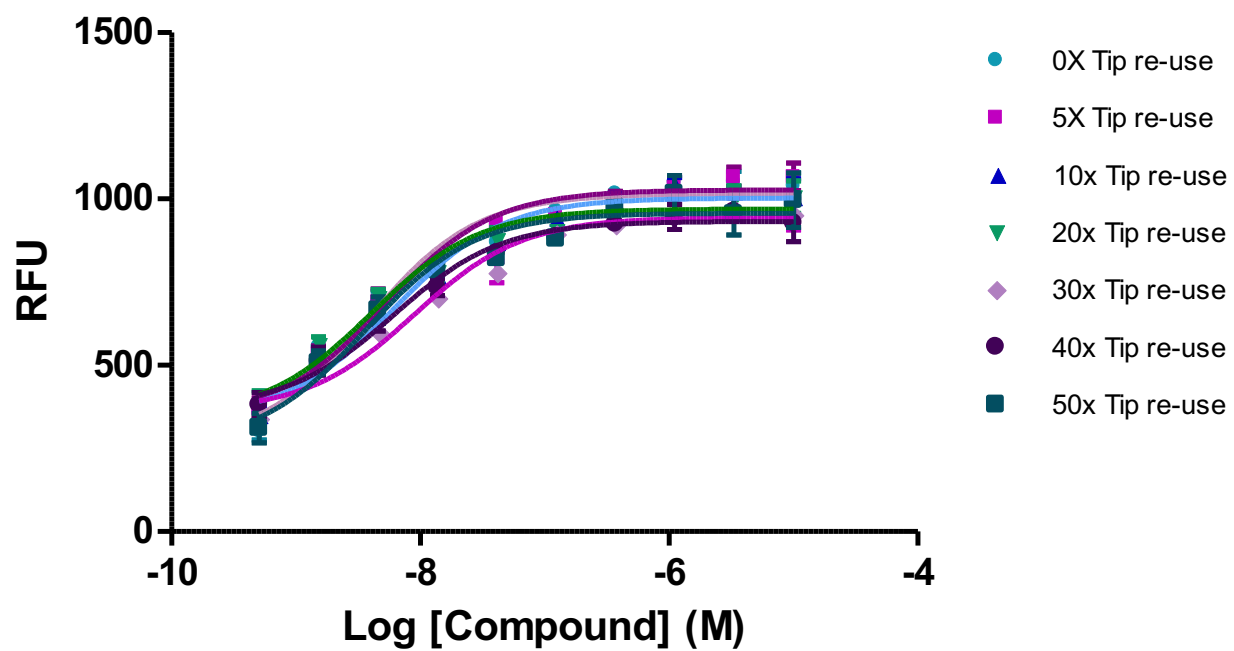
New tips Tips cycled 5X Tips cycled 10X Tips cycled 20X Tips cycled 30X Tips cycled 40X Tips cycled 50X



Beckman 384 Tips

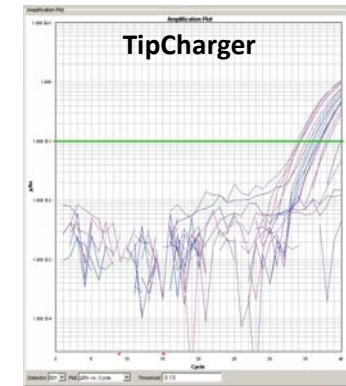
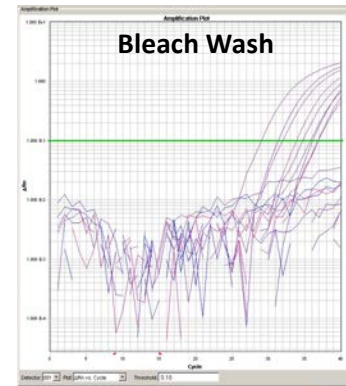
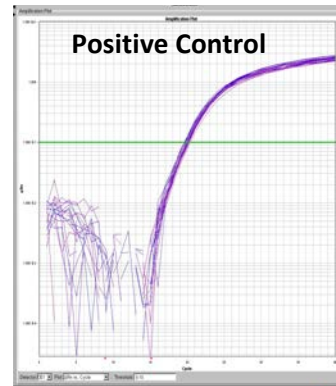
EC-50 Results

Run using the tips from the prior slide
All data points are within spec for assay



Comparison of Bleach vs TipCharger

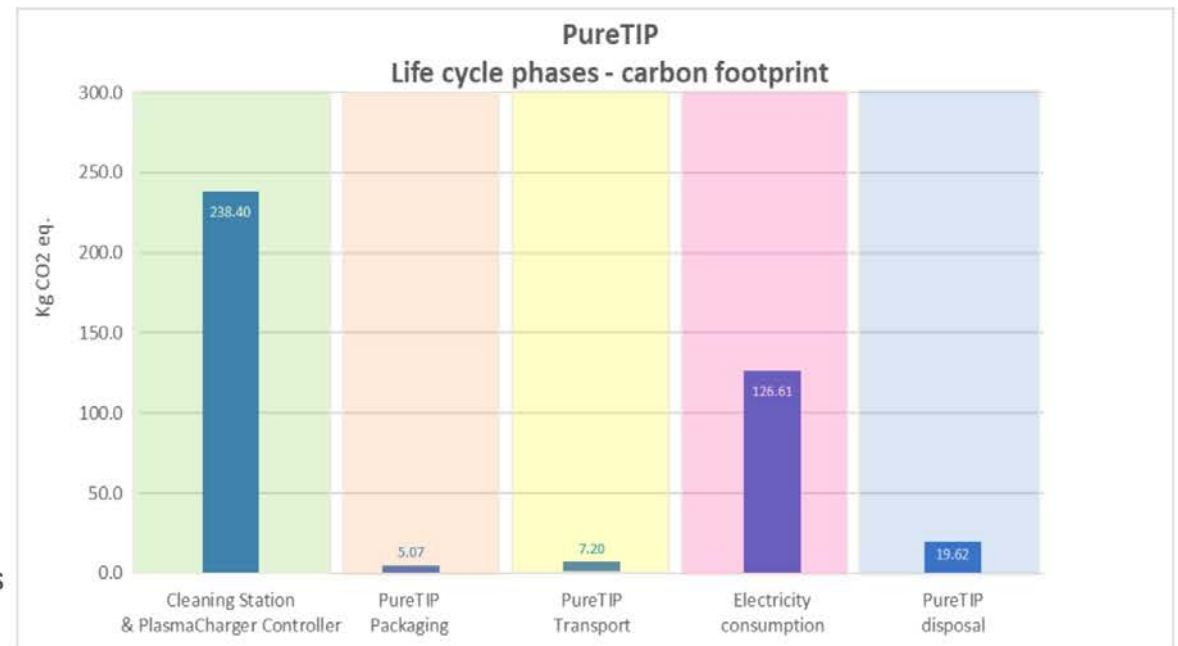
- Genotyping and sequencing
 - Important for sample ID
 - Provides genetic feedback for knockout and disease model samples
- Results
 - Similar to the absence of gDNA
 - 2/3 reduction in wash protocol time
 - Eliminates sample cross contamination
 - Eliminates the need for bleach and issues related to bleach use



A Viable Sustainability Tactic

Impact distribution in life cycle phases

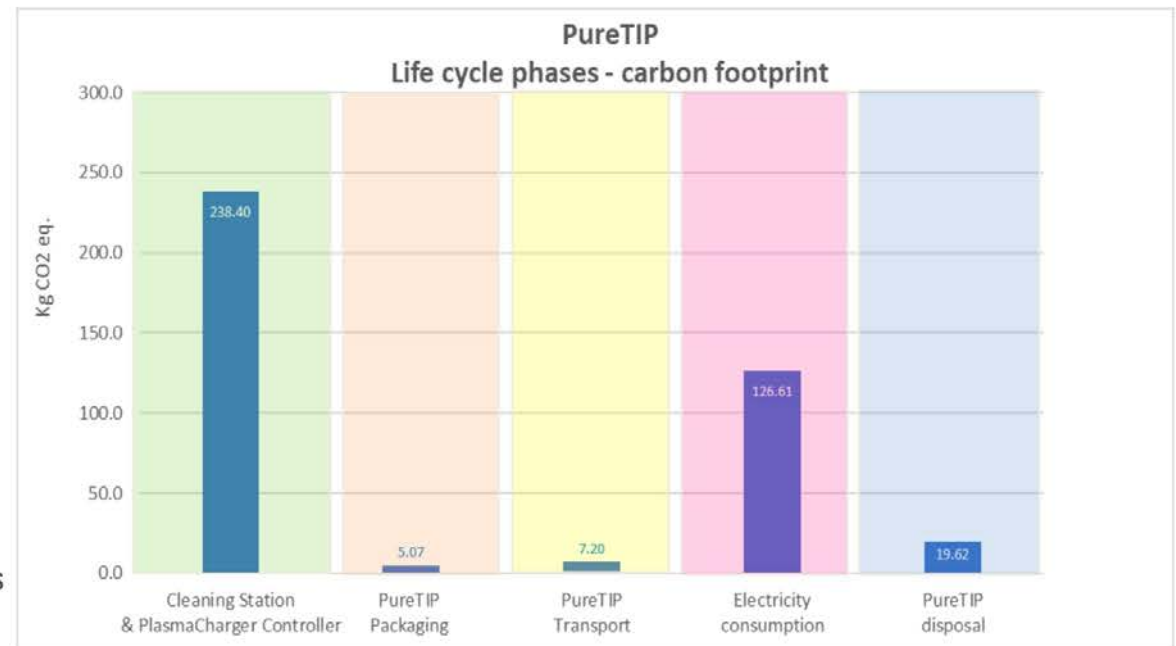
- Distribution of environmental impact in 5 life cycle phases
- Total environmental impact: 428 kg CO2 eq
- 7 years lifespan considered
- Electricity consumption based on:
 - Data for consumption of Standby and Cleaning Cycle
 - 50 cleaning cycles per day, 7 hours per day, 225 days per year
 - Use location: Boston
- End of life: recycling of steel & aluminum, municipal incineration & recycling of plastic parts



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A Viable Sustainability Tactic

LCA comparison: Single-use vs. Clean & reuse

Environmental impact produced by use of 1 Rack of 96 pipet tips

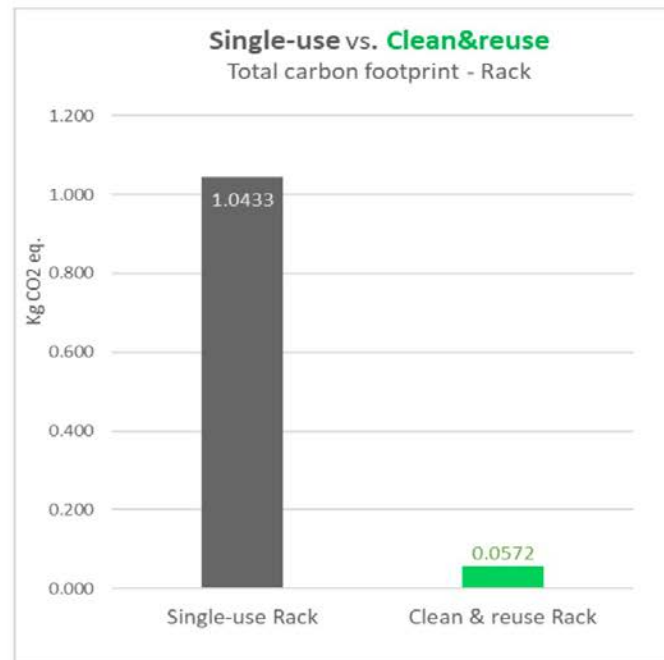
Selected case

Single-use pipet tips:

- Hamilton Filter 300 uL
- Manufacturing location: US
- Use location: US - Boston
- Transport per truck: ~2000 miles

Clean & reuse pipet tips:

- Hamilton Filter 300 uL
- Number of pipet tip uses: 20
- Manufacturing location: US
- Use & cleaning location: US – Boston
- Transport per truck: ~2000 miles
- PureTIP cleaning capacity: 50 cycles/day



A Viable Sustainability Tactic

Sensitivity analysis – Nr. of reuses

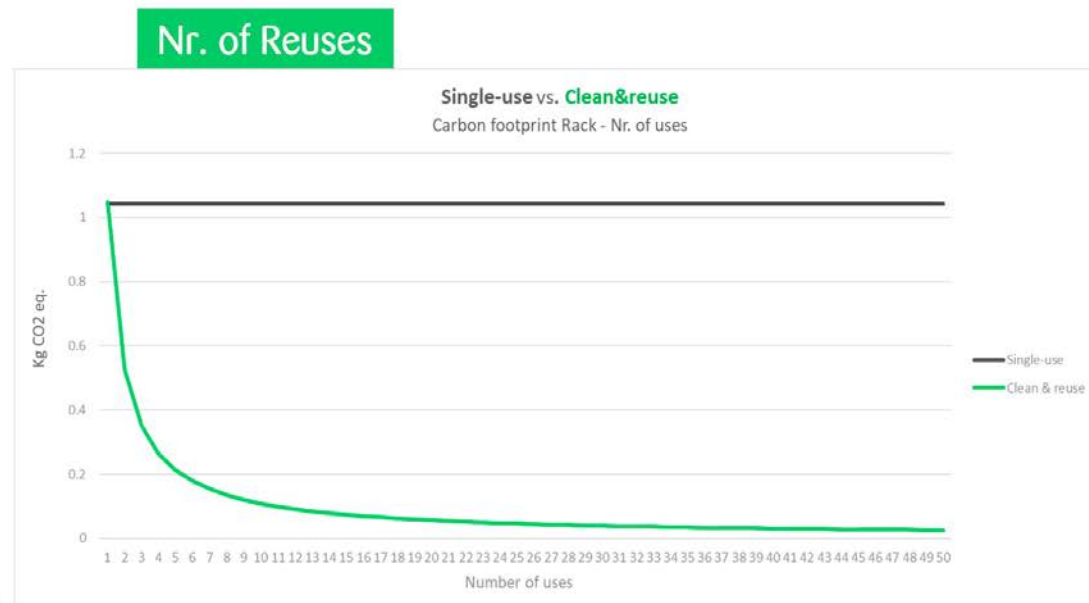
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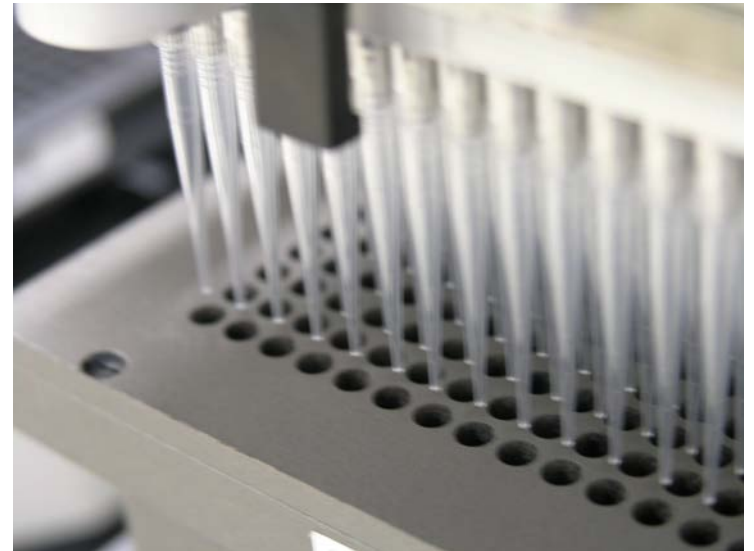
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PureTIP LHC – In Summary

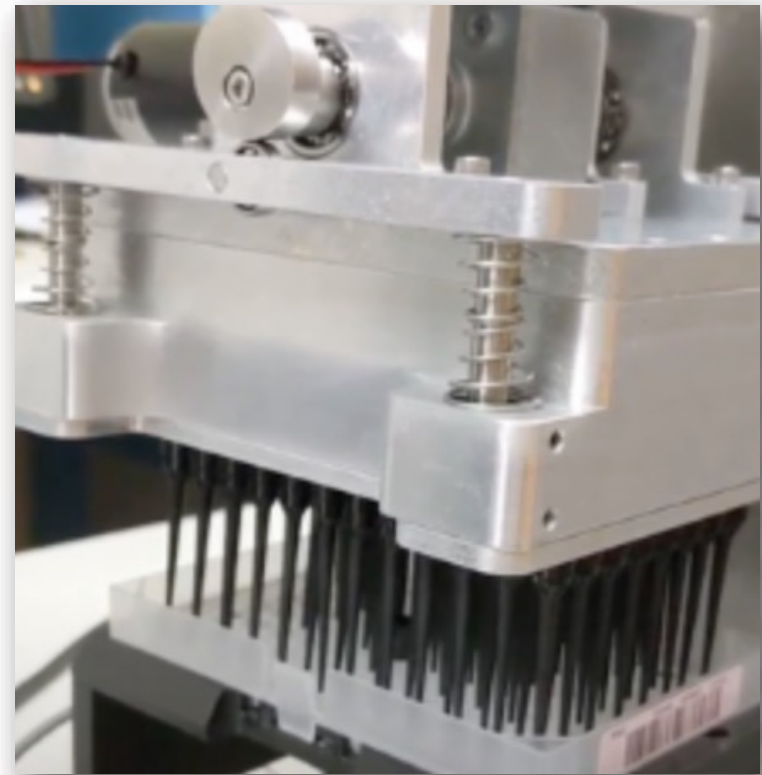
- Effective cleaning of pipet tips, cannulas, and pin tools.
- Drastically reduce a lab's carbon footprint.
- Proven in Pharma, Genomic and Biotech labs to remove:
 - *DNA, RNA, siRNA, mRNA (ie. virtually anything genomic)*
 - *Small molecule drug candidates*
 - *Cellular debris*
 - *Organisms, viruses, DNAase, RNAase, Nuclease*
- Simple to install and maintain, some minor method modification.
- Consistent, reliable performance for years; MTF >7 years.
- No API or interface.



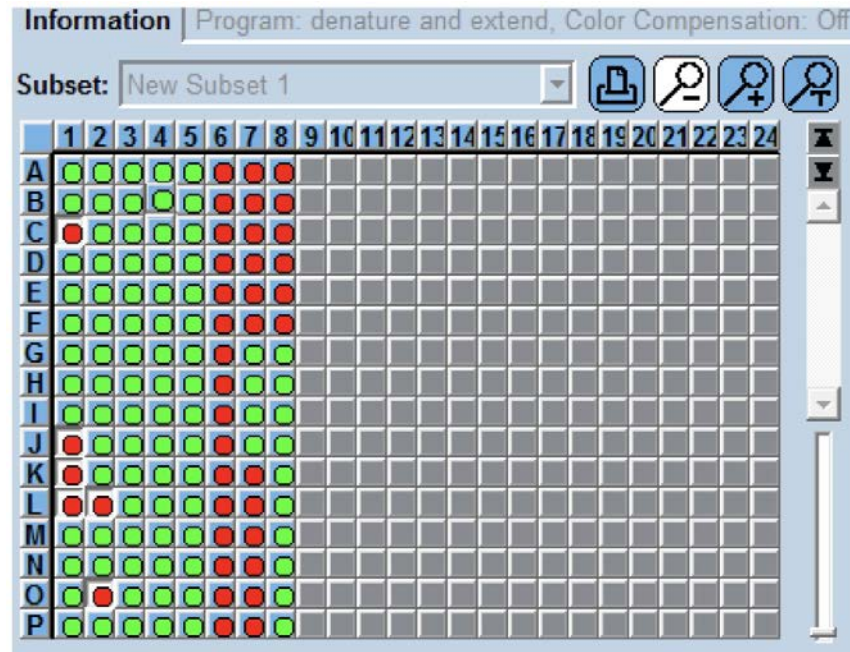


PureTIP Plus Standalone System (SaS)

- Designed for tips commonly used in testing for Covid-19. Uses room temperature atmospheric pressure plasma.
- Uses a vacuum mechanism that pulls plasma continuously up the tip and through the filter.
- Cleans the exterior, interior, and filter, if used.
- Continuous pull of plasma makes the cleaning faster and more powerful than PureTip LHC.
- In less than 2 seconds and throughout out cleaning, maximum plasma intensity used.
- The process generates no waste, liquid or solid.



PureTip Standalone
qPCR Carryover Testing using COVID Sample
Hamilton 1 mL Conductive Filter Tips



Col 1&2 Short exposure time
Col 3-5 Normal exposure time
Col 6-8 Controls – no treatment



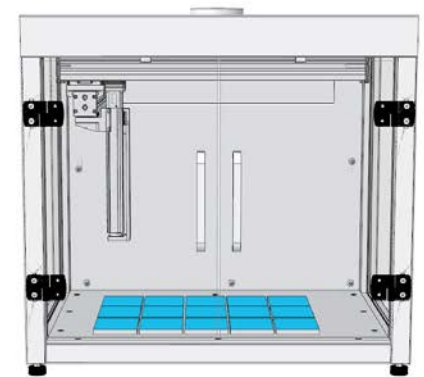
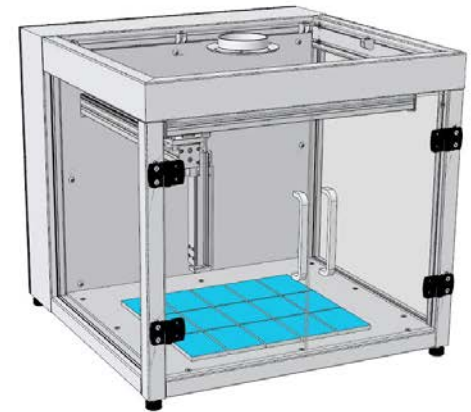
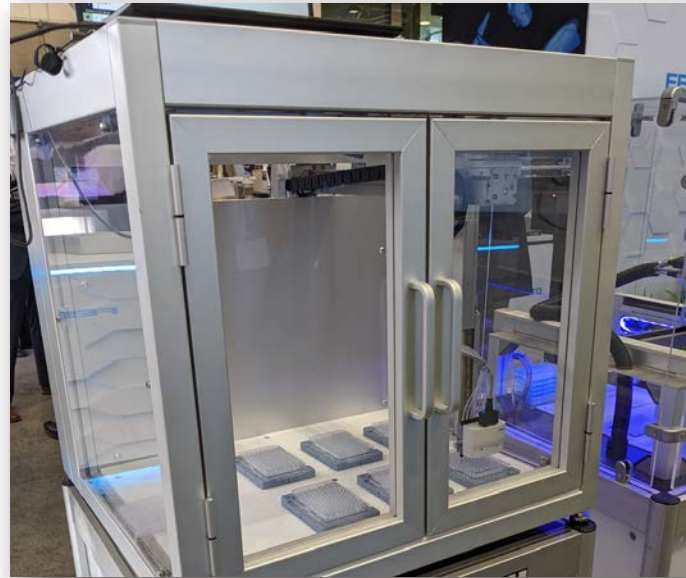
PureTIP SaS Design

Standard

- Gantry system
- Low-force, high-precision tip insertion technology
- Flexible deck can be reconfigured
- Robotically open – easy for “pick and place” robotics
- Safety shields
- HMI touchscreen

Optional Add-ons

- Positive or negative air filtration
- Internal camera
- Light curtains





PureTip Plus SaS – In Summary

- **Exceptional Cleaning:** COVID tips cleaned to background using patented plasma technology.
- **A Standalone Solution:** Easily automated, flexible design
- **Universal:** Conductive/standard, filter/non-filter and volumes from 20 uL to 1 mL.
- **Productive:** Cleans tips @ 30 to 60 racks/hour.
- **Interchangeable:** Patent pending brand-specific mandrels for multiple liquid handlers.
- **Expandable:** Start w/ PureTip & Misting Station, add accessories and robotics later.
- **Adaptable:** Like a liquid handler, it is programmable to meet changing needs.



Any Questions?



Contact Information

- John Woodford, Wildcat
john@wildcat-ls.eu
- Haakon Howard, Wildcat
haakon@wildcat-ls.eu
- Paul Hensley, CEO Ionfield Systems
paul.hensley@ionfieldsystems.com
+1.856.426.1910