



AN INNOVATOR AND
LEADER IN SURFACE
MODIFICATION
TECHNOLOGY

www.aculon.com

A wooden pallet with the Aculon logo on its side. The logo consists of a blue sphere above a black bar and the word "ACULON" in bold, italicized black letters.

ACULON



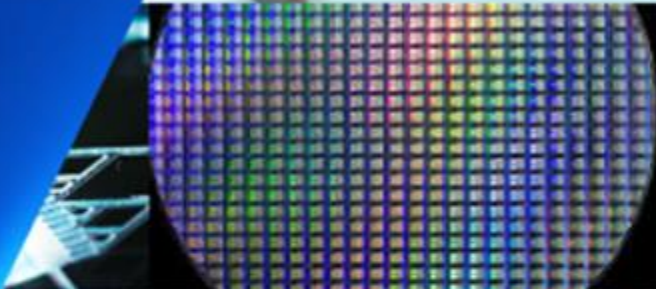


OUR GOAL

Aculon uses its expertise in surface modification technologies to enable customers to make better products by being fast, innovative & responsive.

Together we create winning products!

ACULON





Expertise

Develop & produce surface solutions to modify a broad variety of surfaces (metals, metal oxides, ceramics, glass, polymers)



Functionality

Hydrophobic, superhydrophobic, oleophobic, hydrophilic, oleophilic anti-fingerprinting, adhesion promotion



Treatments

-Thin, easy to apply (no vacuum chambers), often no cure, safe, non-toxic and offer green options.
-Over 100 Products



Focus areas

Electronics, Oil & Gas, Medical, Specialty



Business Model

Optimize custom surface treatment solutions, produce and sell treatment chemistry, treat parts for customers if required



Knowledge

-Over 37 Patents granted.
-Invested 100,000's hours on 1000's projects.
-Smart (numerous Chemists with PhD's & Masters Degrees, Electrical & Mechanical Engineers)



Differentiation

Create proprietary innovative treatments & willingness to work with customer to solve problems



Global

Locations
San Diego (HQ, Lab & Manufacturing), Shanghai, Singapore, Dusseldorf, Amsterdam, Dallas, **Distributors > 12 in Asia**



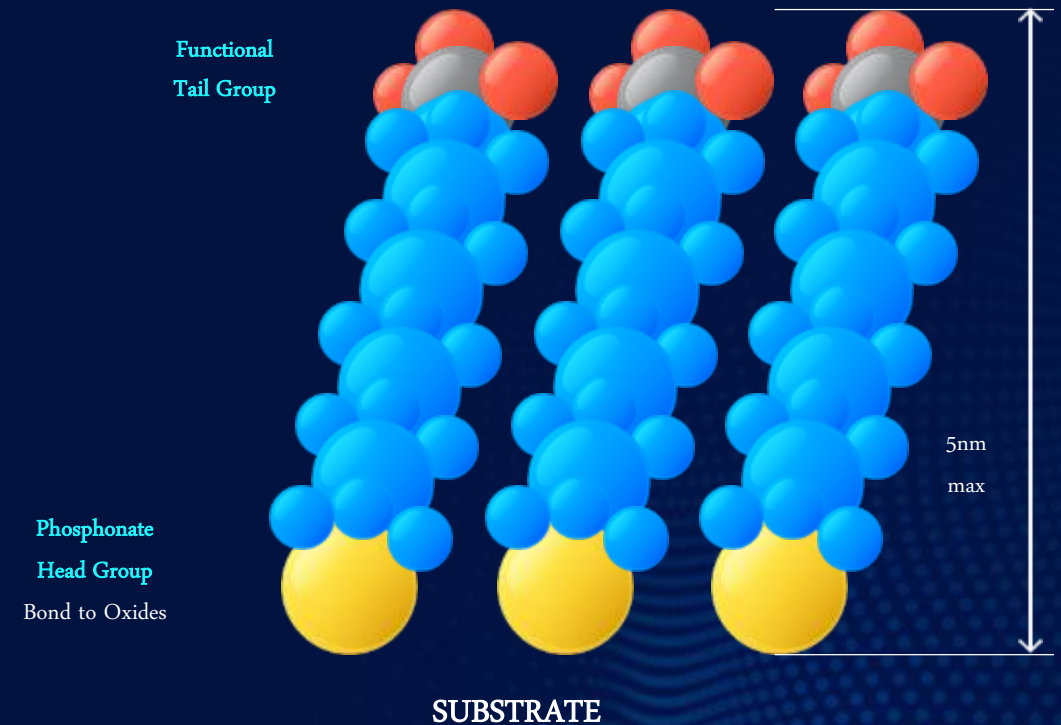
[WATCH VIDEO](#)

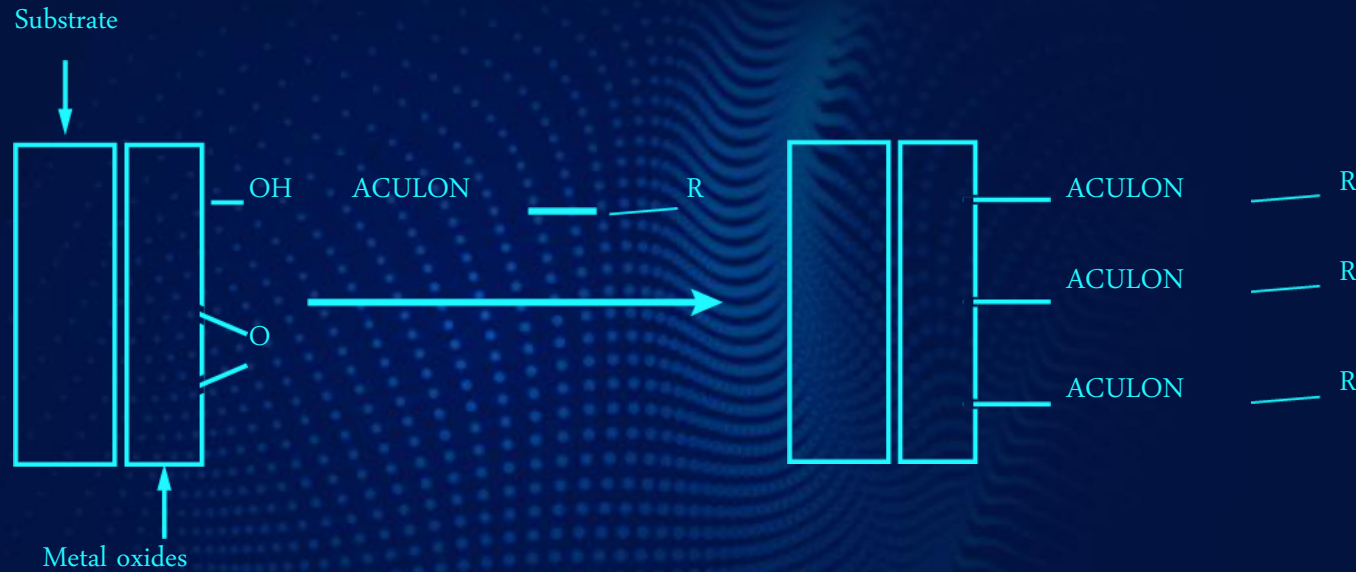
Aculon's proprietary "Self Assembled Monolayer of Phosphonates" (SAMP) can treat surfaces to impart repellency. The SAMP monolayer is comprised of a phosphonic acid and a repellent, carbon-based molecule:

Phosphonic acid reacts with the surface and creates a covalent bond at the substrate: phosphonic acid interface

The carbon group connected to the phosphonic acid is the functional mono layer

The monolayer is less than 5 nanometers thick





Example "R" Groups

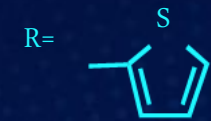
R= -OH

R= CH₃

R= -COOH

R= -CF₃

R= C₂H₅



TAILOR THE "R" GROUP STRATEGY

"Hook"

- Strong Chemical Bonds – Resistant to Abrasion
- Chemically Resistant – Stable as the Underlying Substrate Thermally-Stable – up to 175-250°C
- in ambient air.

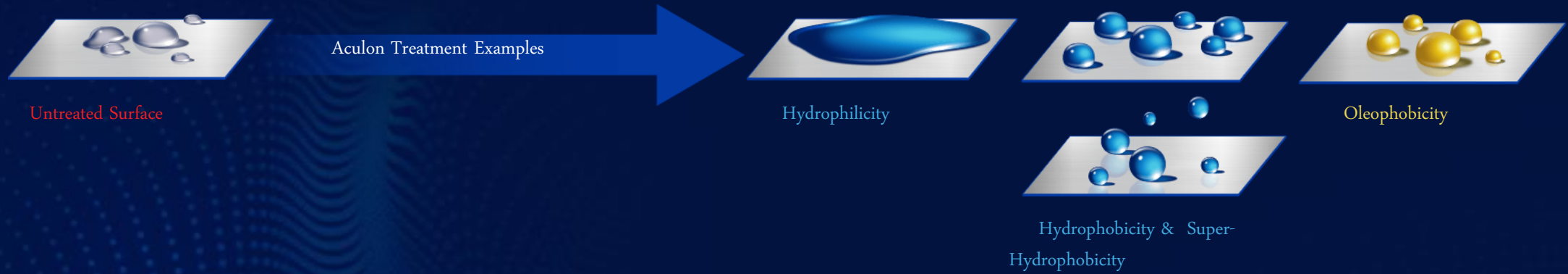
"Tail"

- Surface Functionality – Lubricity, Cleanability, Surface Energy
- Interfacial Functionality – Reactivity, Adhesion of Polymers
-

MANY SURFACE MODIFICATION PLATFORMS



ACULON SURFACE PROPERTIES ADJUSTMENTS AT A GLANCE:



Application Examples:



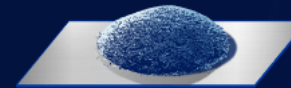
Easy Clean & Anti-Fingerprint



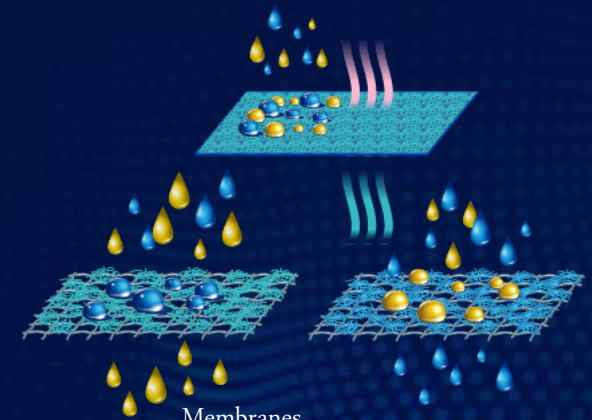
(Electronics) Waterproofing



Adhesion Promotion



Particle Treatment



Membranes Treatment

ACULON – BECAUSE SURFACES MATTER!

The application process depends on the application but can include:

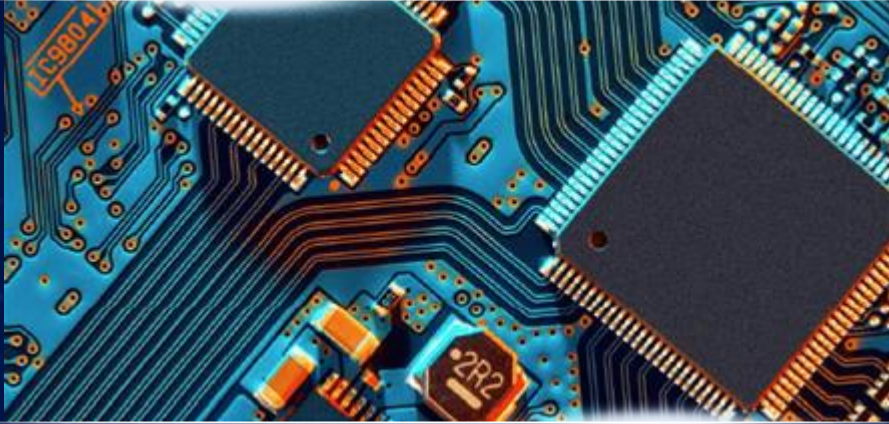
- Dip Applied
- Wipe Applied
- Spray Applied
- Roll to Roll

Parameters:

- Concentrations
- Coverage
- Solvent
- Temperature







Electronics



Medical



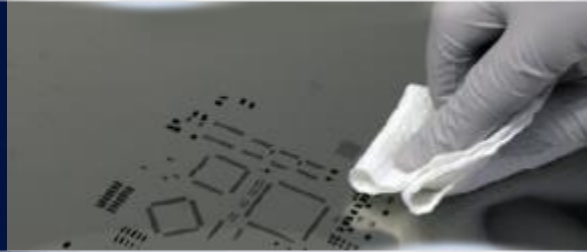
Oil & Gas



Specialty - Other



NanoProof®
Electronics Waterproofing



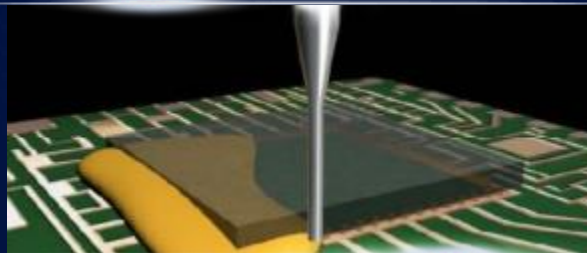
NanoClear®
SMT Stencil Nano-Coating



Anti-FingerPrint Coatings
Hide appearance of prints



Adhesion Promotion
Improve Bond Strength



Epoxy & Underfill Control
Prevent adhesive flow out



Test Pin Repellency Coatings
Increase Test Pin Lifetime

In real life, electronic devices are often damaged

- Device dropped in pool or even toilet
- Household appliances exposed water during operations
- Unit exposed to outdoor environment – rain, humidity
- Equipment (industrial and medical) exposed to wet working environment



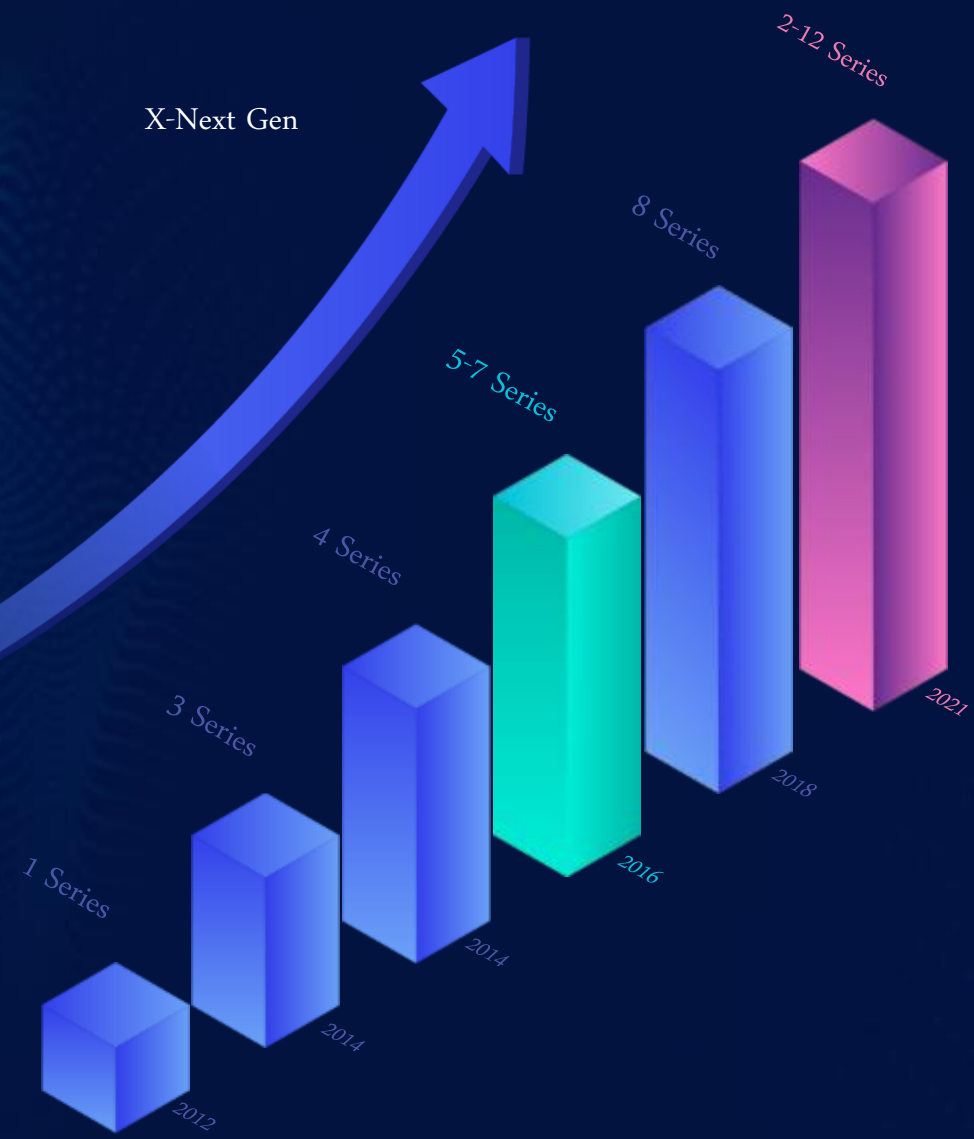
Award winning liquid applied electronics waterproofing technology

Aculon NanoProof® Series provides water protection from humidity to full water immersion

- Utilize proprietary technology
- Application equipment affordable and readily available – more scalable than vacuum dep
- Range of treatments available to meet performance, thickness, application and economic needs. From IPX3 to IPX8



NanoProof Technology Evolution



-  Push-through Connectivity
-  Flexible
-  Green / VOC Exempt

NANOPROOF BENEFITS



Nano Proof Series	IPX	In-Line	Non-Toxic	Push Through	Flexible	Green/VOC Exempt
1	3	✓	✓	✓	✓	✓
5	5	✓	✓	✓	x	✓
8	8	✓	✓	✓	✓	✓
X	8	✓	✓	x	✓	✓
12	8	✓	✓	x	✓	✓
2	8	✓	✓	✓	✓	✓

NanoProof	NanoProof	CVD	Parylene
Short Cycle Tie	✓	✗	✗
High UPH	✓	✗	✗
Low Capital Equipment Cost	✓	✗	✗
VOC Free & Non Toxic	✓	✗	✗
No Complex Exhaust System	✓	✗	✗
Flexible	✓	✗	✗
No masking	✓	✗	✗
Push Through Connectivity	✓	✗	✗

1

Reduce Product returns due to water damage

2

Improve yields as rework is possible after coating

3

No or minimal masking required

4

Coatings are safe, non-toxic and can be used in factory environment

The coating process depends on the treatment selected but could include:



Spray

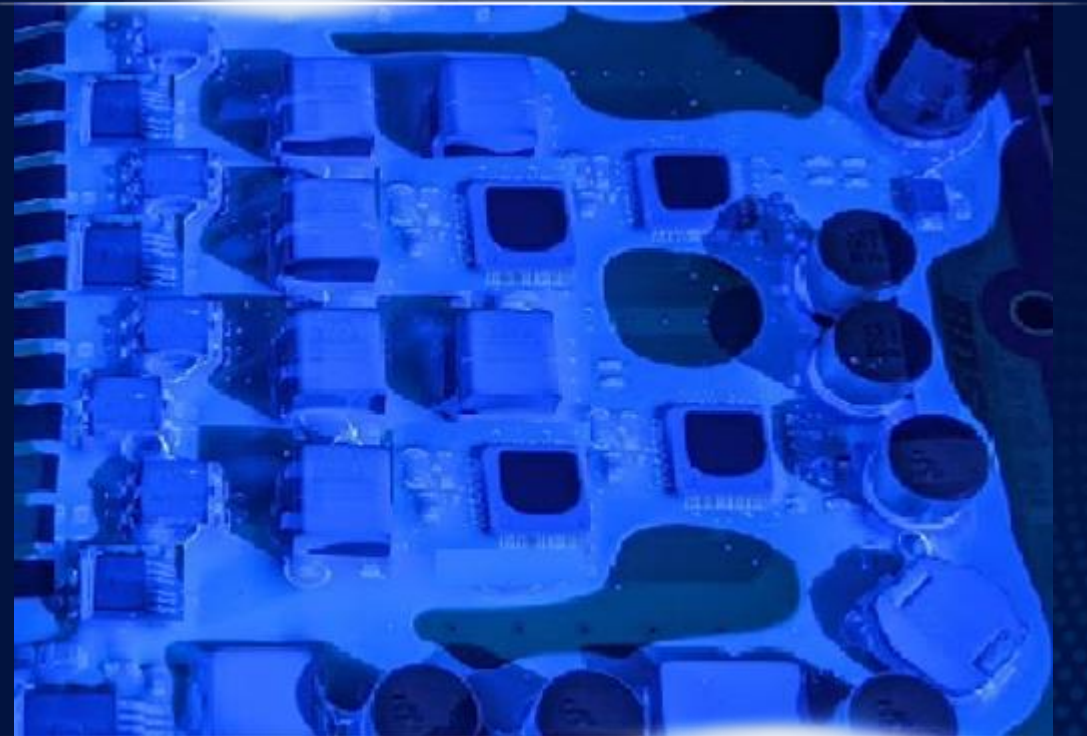
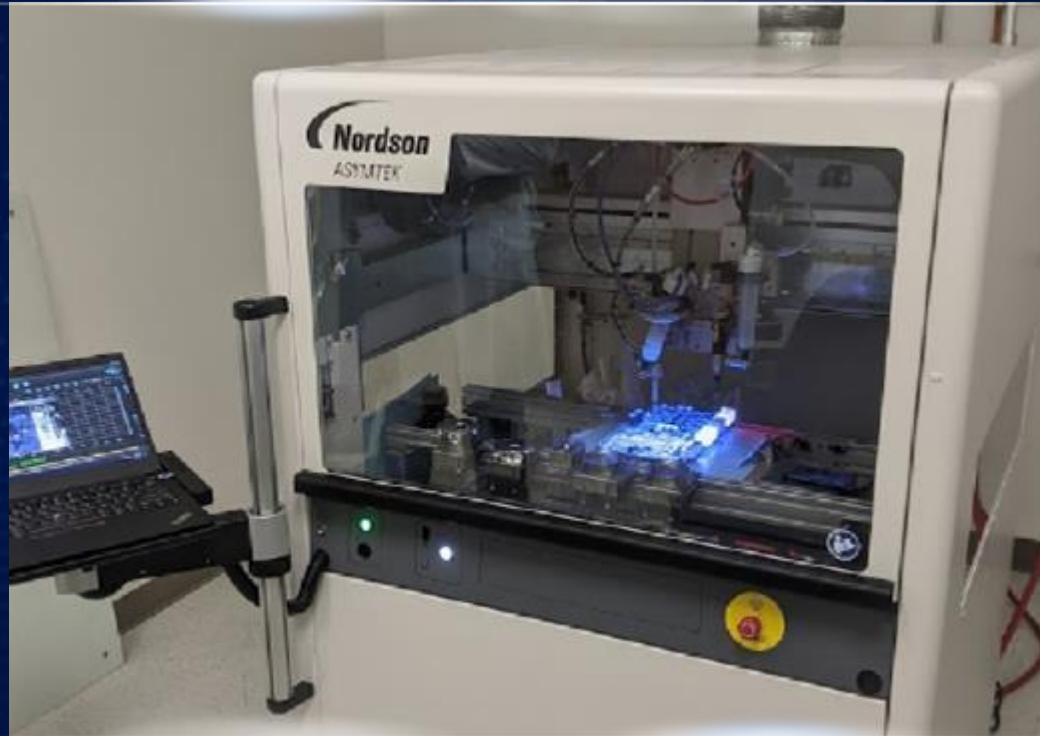


Jet or Dispense



Dip

NanoProof material all contain UV dye for AOI or visual inspection



Award winning & #1 global nanocoating applied to stencil underside & apertures

1 Improve Quality

- Higher yields
- Better transfer effectiveness

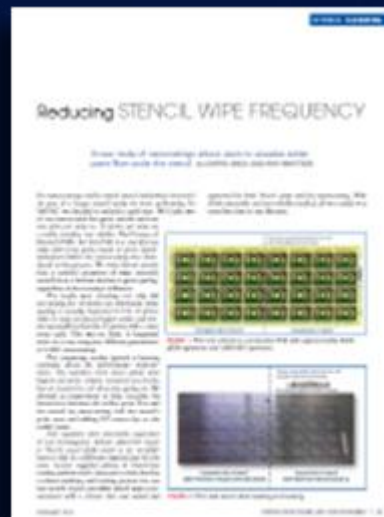
2 Boost Productivity

- Less underwiping
- Less downtime for paper changes

3 Reduce Costs

- Less rework
- Lower paper and solvent consumption





NANOCLEAR SUMMARY



- ALL stencils benefit - Not just for fine pitch stencils
- Easy to calculate benefits:
 - Improved Quality
 - Boost productivity
 - Reduced Costs
- Coats the aperture walls
- Techniques to enhance durability – Soft wipes & clean better!
- Available locally on a global basis

Nanoclear enables
higher quality, more
cost-effective
stencil print process



ANTI-FINGERPRINT (AFP) TECHNOLOGIES



Award Winning easy clean and Anti-Fingerprint (AFP) treatments for electronics and other applications



WINNER

GLOBAL TECHNOLOGY AWARDS 2020

GLOBAL SMT & PACKAGING
Global Technology Award

Aculon, Inc.
CONFORMAL COATING MATERIALS
Aculon Anti-Fingerprint Coatings

Each year, the GLOBAL Technology Awards recognize and celebrate innovation in electronics manufacturing equipment, tools, services, and supplies on a global scale.

GLOBAL SMT & PACKAGING
CELEBRATING 20 YEARS

GlobalSMT.net/awards

The image shows a large, faceted crystal trophy with a globe on top. To the right of the trophy is a white award card with a colorful, abstract background. The card contains the text "WINNER GLOBAL TECHNOLOGY AWARDS 2020" in large, bold letters. Below this, it lists the winner as "Aculon, Inc." for "CONFORMAL COATING MATERIALS" and "Aculon Anti-Fingerprint Coatings". A paragraph of text describes the awards, and at the bottom, it features the "GLOBAL SMT & PACKAGING CELEBRATING 20 YEARS" logo and the website "GlobalSMT.net/awards".

Extremely thin optically clear AFP – Hiding Power treatments are applied to the surface which:

■ Hide the oil of the fingerprint

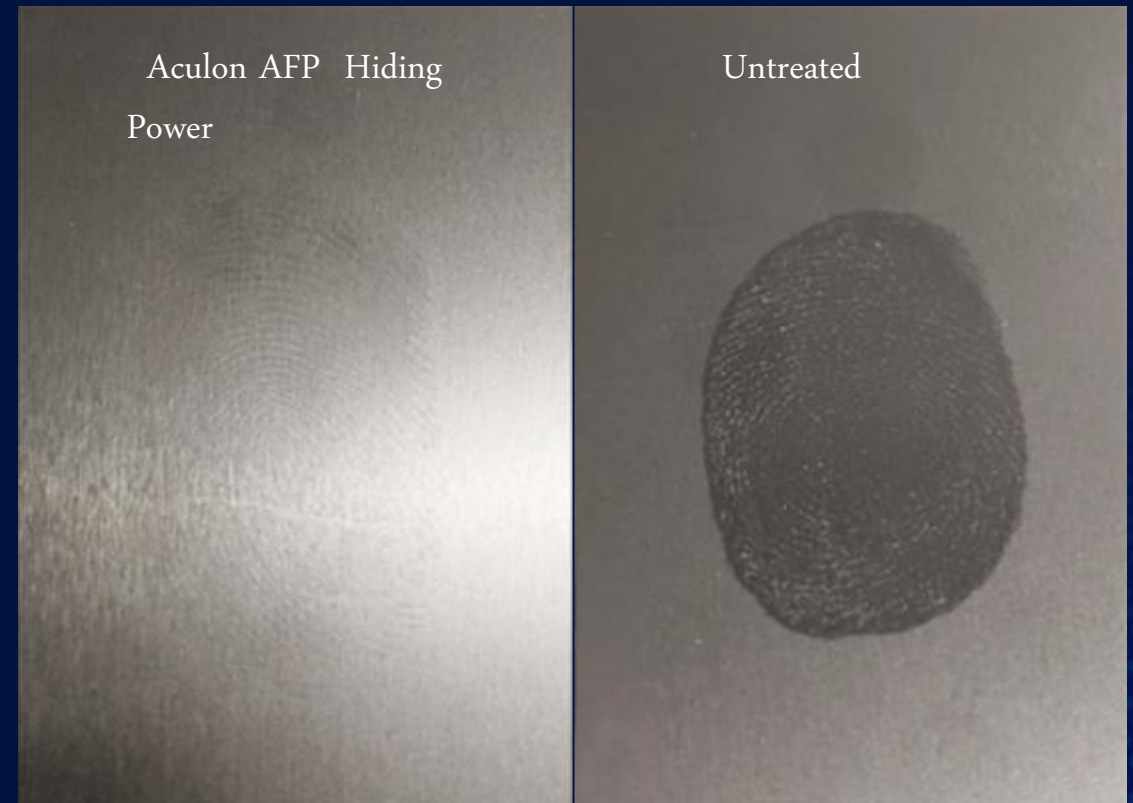
- Allow light to pass, significantly reducing its appearance

■ Offer Easy Clean Properties

- Hydrophobic behavior assists with making it easier to clean fingerprints without chemicals

■ Durable

- Robust coatings offer ongoing AFP performance after normal handling



Aculon AFP Easy Clean

■ Increase oleophobicity & hydrophobicity

- Significantly improves the ease of cleaning fingerprint contaminated surfaces

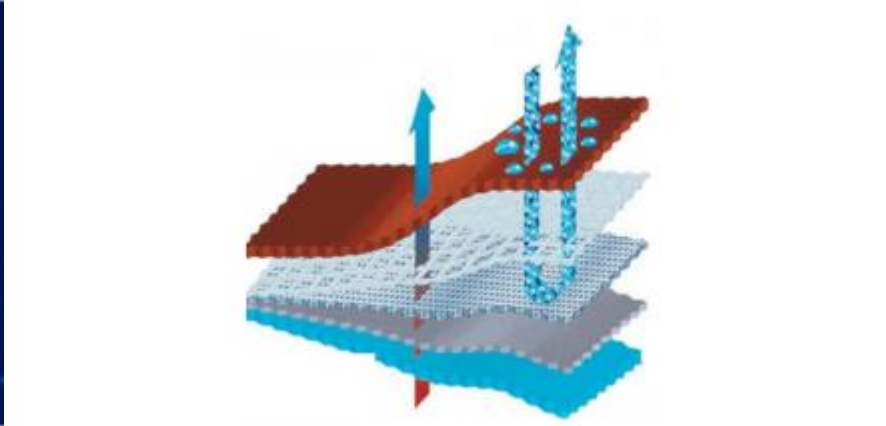
■ Allow for cleaning with no solvents

- Remove fingerprints with dry cloth wipe

■ Durable

- Robust coatings offer ongoing AFP performance after normal handling





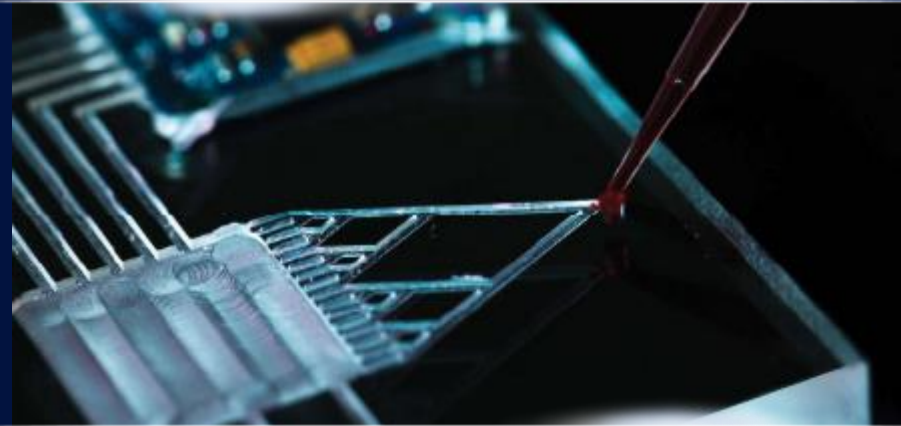
Membranes



Guidewires



Blood Repellency



Microfluidics

■ Oleophobic Treatments for Membranes

- Allow water to pass through while preventing transport of oils and other organics

■ Hydrophobic Treatments for Membranes

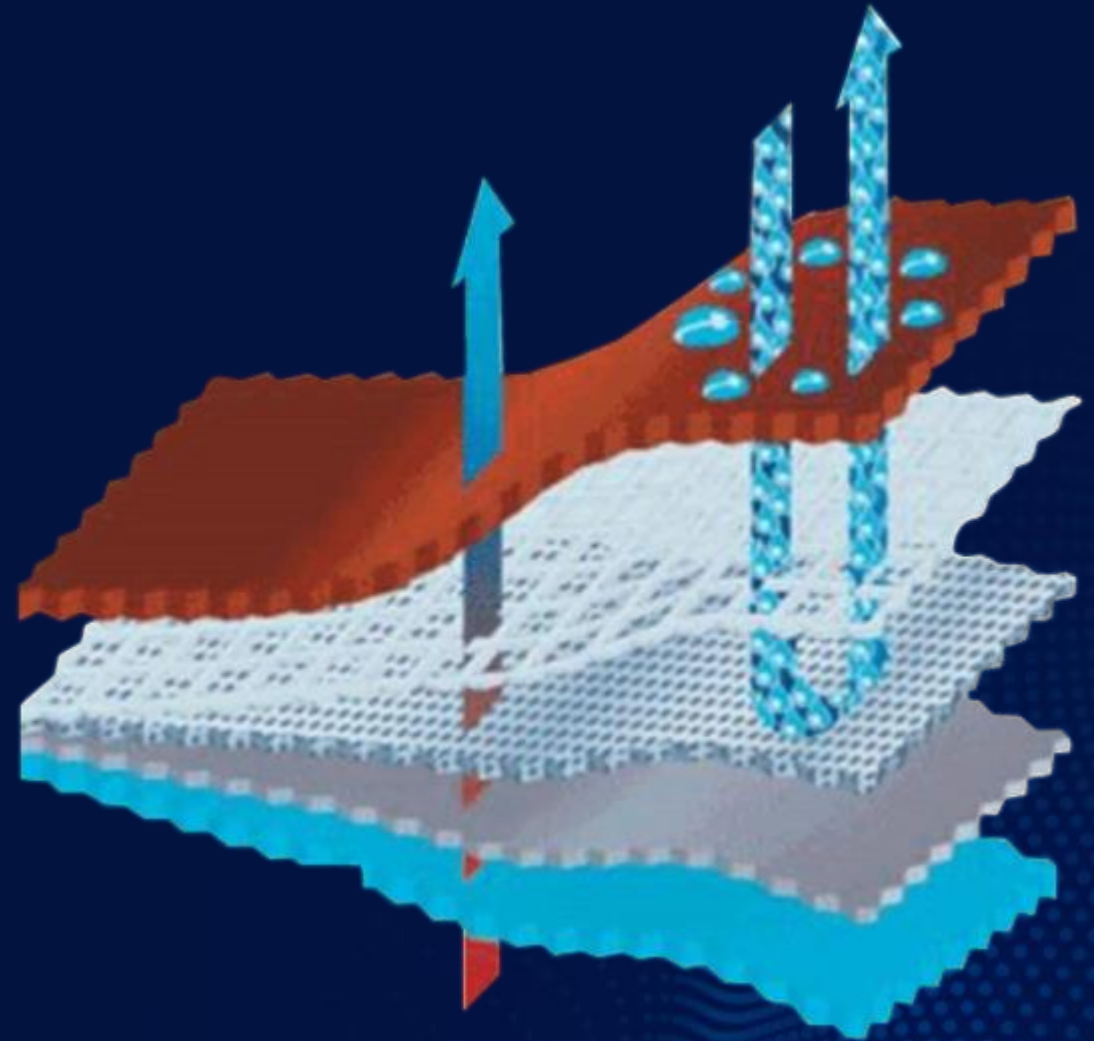
- Allow oils and other organics to pass while preventing transport of water and other aqueous liquids

■ Vapor Permeable Treatments

- Prevent transport of liquids while allowing passage of gas and vapour

■ Hydrophilic Treatments

- Improve wettability and hence water transport and anti-fouling properties





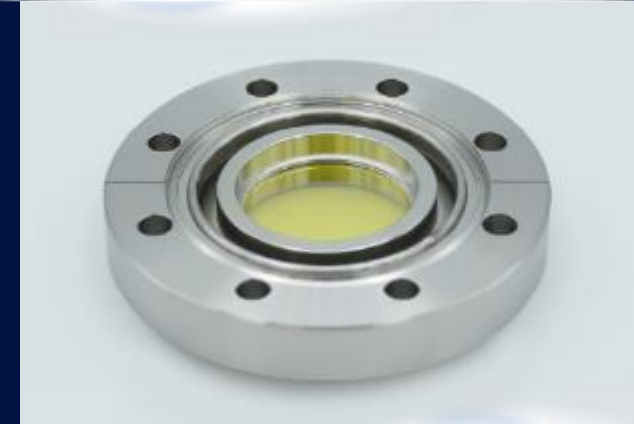
Anti Fouling

Treatment of storage tanks, stainless pipes, & containment booms to prevent paraffin and asphaltene build up due to contact with crude oil



Enhanced Oil Recovery

Treat rock formation down well reduce water blockages and enhance oil flow for new well completions and remediations.



Optics

Treat sapphire to prevent oil wetting on surface impacting optics



Metal Repellency



Wheel Weight Adhesion



Optical Applications



Guitar Strings

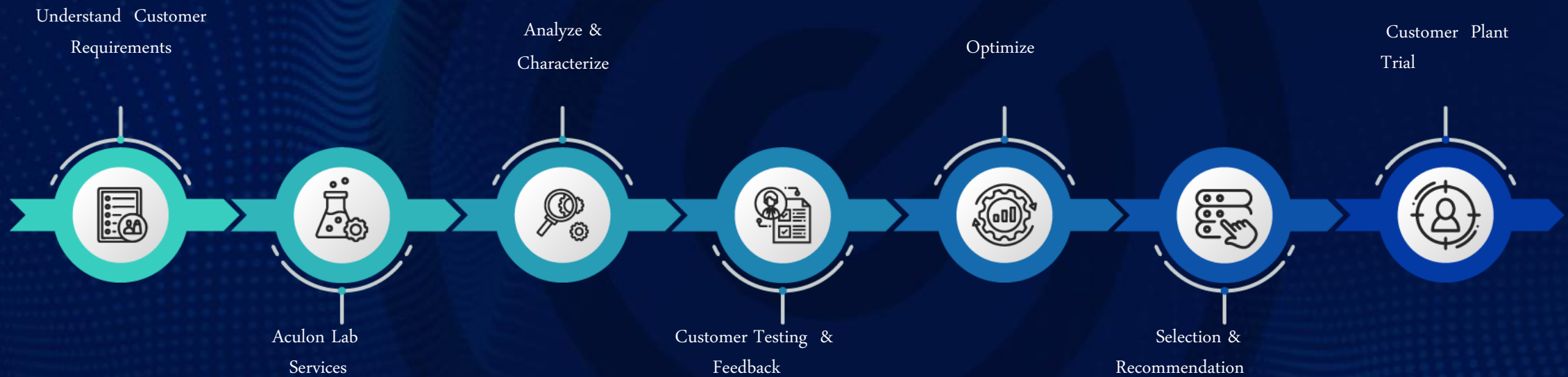


Watches



Cutting Blades

HIT YOUR TARGET



Strong combination of hard and soft IP:

- Granted over 40 Patents
- Developed many trade secrets
- Treated and tested thousands of applications
- UCSD Partnership gives access to millions of dollars of equipment
- Spent hundreds of thousands of hours solving surface problems
- Invested millions of dollars in building capabilities & expertise



Aculon is committed to offering a range of environmentally friendly products and follow good sustainable business practices. We help our customers support their sustainability goals and help protect the environment.



VOC-Exempt Options



PFOA-Free Products



Eco-Packaging & Waste Reduction

- Nearly all Aculon packaging (shippers, pails, bottles) is reusable or recyclable
- Green alternatives are utilized wherever possible From paper to pens, reusable or recyclable office
- supplies are used throughout our business operations



Reduced Transportation-Related Emissions

- Reduced material used → reduced transportation of material & wastes
- Localization with suppliers & distributors in Europe & Asia
- Utilize carbon-neutral shipping options when using UPS



Sustainable Energy & Increased Efficiency

- Retrofitted LED Lighting Throughout our HQ (>800 LEDs) & Utilize Extensive Natural Light
- Switched to Energy Efficient Equipment

-  Platform technology company that make customers products better!
-  Surface solution experts
-  Strong history of working with customers to solve problems
-  Broad portfolio of products, including more sustainable options
-  Strong IP, testing capabilities and in-house expertise



PERFORMANCE

• SURFACE

• SOLUTIONS

THANK YOU

aculon.com