Aculon’s NanoProof® Series offers customers a range of easy-to-apply PCB waterproofing solutions to protect PCBs from accidental water damage to IPX-7 (immersion in water at one meter depth for 30 minutes), and up to full barrier properties.

Benefits of the NanoProof® Series Include:

• Improved Device Reliability Due To Protection Of PCBs From Water Damage
• From Accidental Submersion (IPX-4), Immersion For 30 Minutes (IPX-7) To Prolonged Immersion (IPX-8)*
• Reduced Product Returns Due To Device Failures
• Reduced Cost As No Masking Required
• Improved Yields As The Coating Enables Rework After Application
• Can Be Applied Via Spray, Dip, Or Dispense, Eliminating Need For Costly Vacuum Equipment
• Save Energy Compared To Vacuum Equipment
• Improve Throughput As It Does Not Require Batch Production
• Safe For Use In Factory Equipment - Non Toxic
• Electrical Connection Unimpacted - No Impact On Signal Strength, Antenna Or Acoustic Performance
• Flexible Coatings Resist Cracking/Flaking

NanoProof® Features:

• Liquid At Room Temperature
• Ability To Protect Many Substrates On A PCB
• Post Treatment Water Contact Angle From 100°-120°
• Post Treatment Oil Contact Angle Up To 76°
• Push Through Connectivity On Some Products
• Dry Time From 5-60 Minutes At Room Temperature
• No Cure Required
• UV Tracer

Advantages over Conformal Coatings:

• Provides Effective Water Protection - Full Submersion
• Flexible Application Process: Spray, Dip, Dispense
• Minimal Capital Equipment Required
• Production Is Continuous Process, Not Batch
• Treatment Allows Push Through Connectivity
• Treatment Enables Rework - Lowers Internal Rejection Rate
• No Masking Required - Can Even Coat Batteries
• Fast Cycle Times: <1 Minute Vs 1-5 Hours In Chamber
• Safe, Non-Toxic

www.Aculon.com/nanoproof-pcb-waterproofing/
Key Application Considerations

Key questions to consider which will guide your Aculon® representative to recommend the ideal routes to waterproof your boards:

- Is full immersion required?
- Do you have a specific thickness requirement?
- Is there a specific required process? (Dip/Spray/Dispense?)
- Do you need oleophobicity or solvent resistance?
- Is full board coverage required or are there keep out areas with tight tolerances requiring selective application?
- Push Through Connectivity: Are there connectors on the board that would be desirable to treat?
- Is flexibility needed?
- Can you handle flammable solvents in your facility?
- Is there a handling requirement post-application that will require a dry (non-greasy/tack & non-transferable) coating?
NanoProof® Series Product Attributes

NanoProof® 1.0
Designed for accidental water damage
- Water contact angle - 100 degrees
- Protection for water damage up to IPX-3
- Make electrical contact through barrier
- Very forgiving in application
- Extremely flexible - 180 degree bend
- <200nm thickness
- Film is non conductive
- No cure required
- UV Tracer available
- ROHS & REACH compliant

NanoProof® 2.0
Designed for moderate water protection
- Water contact angle - 100 degrees
- Spray or dip applied
- 5 - 15 μm thickness
- “Push through connectivity” capability
- Dry time - 20 minutes at room temperature
- No cure required
- Contains UV Tracer
- ROHS & REACH compliant
- Flexible - 180 degree bend

NanoProof® 4.0
Designed for moderate water protection
- Water contact angle - 115 degrees
- Spray or dip applied
- 5 - 10 μm thickness
- “Push through connectivity” capability
- Dry time - 20 minutes at room temperature
- No cure required
- Deformable (gel-like) coating: handle with care
- Contains UV Tracer
- ROHS & REACH compliant
- Flexible

NanoProof® 5.1
Designed for moderate to robust water protection
- Water contact angle - 120 degrees
- Oil contact angle - 76 degrees
- Spray or dip applied
- 5 - 15 μm thickness
- “Push through connectivity” while drying only
- Dry time - 10 minutes at room temperature
- No cure required
- Contains UV Tracer
- More effective barrier than NanoProof® 4.0
- ROHS & REACH compliant

NanoProof® 7.0
Designed for extreme water protection
- Water contact angle - 120 degrees
- Oil contact angle - 76 degrees
- IPX-7 - i.e. 30 minutes immersion at 1 meters - Pass
- PCB immersion in salt water >60 hours
- Film coat, dispense, or dip applied
- “Push through connectivity” capability
- 30 - 50 μm thickness
- Dry time - 30 minutes at room temperature
- No cure required
- Contains UV Tracer
- Non-toxic Solvent blend
- ROHS & REACH compliant
- More effective barrier than NanoProof® 5.1 and designed for applications requiring extreme levels of protection.

NanoProof® 8.4
Designed for extreme water protection
- Water contact angle - 115 degrees
- IPX-7 - i.e. 30 minutes immersion at 1 meters - Pass
- More forgiving during application
- Film coat, dispense, or dip applied
- 30 - 50 μm thickness
- Flexible - 180 degree bend
- “Push through connectivity” capability
- Dry time - 30 minutes at room temperature
- No cure required
- Contains UV Tracer
- ROHS & REACH compliant
- More effective barrier than NanoProof® 5.1 and designed for applications requiring extreme levels of protection.

Phone: USA (858) 350-9474   Email: sales@aculon.com   www.Aculon.com
Aculon® NanoProof® Products Characteristics

<table>
<thead>
<tr>
<th>NanoProof® 1</th>
<th>NanoProof® 2.0</th>
<th>NanoProof® 2.1</th>
<th>NanoProof® 4</th>
<th>NanoProof® 5*</th>
<th>NanoProof® 7*</th>
<th>NanoProof® 8</th>
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<tbody>
<tr>
<td><strong>System Level</strong></td>
<td><strong>Water Protection</strong></td>
<td>IPX3</td>
<td>IPX3</td>
<td>IPX8</td>
<td>IPX4</td>
<td>IPX5</td>
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<tr>
<td><strong>Applications</strong></td>
<td></td>
<td>motherboard, flex circuits</td>
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<td>motherboards</td>
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<tr>
<td><strong>Application Methods &amp; Thickness Ranges</strong></td>
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<td>spray: 100nm to 1µm</td>
<td>spray: 5 to 15µm</td>
<td>dispense: 30 to 50µm</td>
<td>spray: 5 to 10µm</td>
<td>spray or jet: 5 to 15µm</td>
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<tr>
<td><strong>Push-Through Connectivity® (Apply To Connectors)</strong></td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no</td>
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</tbody>
</table>

*NanoProof® 5 and 7 also provide protection from oil

Application Process

Aculon’s NanoProof® material is compatible with manual and automated application methods from major coating material suppliers, including PVA and Nordson Asymtek. Together with your preferred equipment supplier, Aculon® will work with you to determine the best application process for your needs.

**Spraying:** (preferred method for 1.0, 2.0, 4.0, 5.0, & 5.1)
Apply Aculon® NanoProof® PCB Water Protection Treatment via spray gun. Aculon® NanoProof® PCB Water Protection Treatment comes in 1L bottles for spray applications. Spray application typically results in treatment thickness of 50 nm - 15 µm depending on process parameters and chemistry selected. NanoProof® 7.0 & 8.4 can NOT be spray applied.

**Film Coating:** (preferred method for 7.0 & 8.4)
Apply Aculon® NanoProof® PCB Water Protection Treatment via film coat equipment. Aculon® NanoProof® PCB Water Protection Treatment comes in 1L bottles for film coat applications. Film coat application typically results in treatment thickness of 30 - 50 µm depending on process parameters and chemistry selected.

**Dip Coat**
Fully immerse the part in the Aculon® NanoProof® PCB Water Protection Treatment solution for 30 seconds. Withdraw the part at a steady rate to ensure even coverage. Allow to dry or cure depending on your substrate. Aculon® NanoProof® PCB Water Protection Treatments come in convenient 1L quantities for dipping applications.

**Dispense**
Dispense product over the surface. Apply enough material to coat the surface.