

Electrical + Circuits

Technical Data Sheet

NmTM
Nanoman

THE SCIENCE of PROTECTION

1 Description

Nanoman Electrical + Circuits is a moisture protection coating that effectively and economically protects electric and electronic devices and installations from all forms of moisture. It not only provides protection it restores connectivity / conductivity without compromising on insulations even if the object is already wet or has even been fully submerged.

Using the latest developments in nanotechnology Nanoman Electrical + Circuits is both resistive and conductive. It imparts and delivers dielectric properties which improve insulation resistance and prevent leakage. At the same time, the coating also improves the surface's electric conductivity. After applying to a surface, it displaces moisture, and forms an elastic protective coating, which does not harden or go brittle over time. The electrical insulation properties of coated surface increase and insulation resistance is enhanced.

Even in the harshest of environments or after total inundation, or in extreme humidity, Nanoman Electrical + Circuits displaces moisture and provides an ongoing flexible protective coating, which gives protection from both short circuiting and oxidation. Formulated using nanotechnology on a mixture of highly refined mineral oils and naphthenic hydrocarbons the coating builds a three-dimensional nanostructured hydrophobic network that has extreme penetration and capillary abilities.

Nanoman Electrical + Circuits effectively pushes moisture away from all electrical connections and equipment, to maintain the electrical circuit. Moisture is both driven out from and prevented from entering the treated area restoring connectivity and eliminating short-circuiting / electrical breakdowns.

Nanoman Electrical + Circuits prevents short circuits and breakdowns of industrial and consumer electrical devices, as well as significantly increasing the service life of the equipment. It is suitable for PCB's, Electric and Electronic equipment. It eliminates moisture induced short circuits, even when the surface is already wet and insulates previously out of order parts securing long term faultless operation under adverse conditions.

Nanoman Electrical + Circuits is essential protection against water damage and equipment failure due to moisture and extreme weather conditions.

2 Feature Benefits

- Ongoing protection of electrical and electronic equipment from exposure to all forms of water; steam, humidity, condensation, fog, rain, flooding, chlorinated and salt water
- Prevents costly electrical outages and reduces maintenance, equipment replacement and labour costs.
- Displaces moisture, quickly dries out electrical systems to eliminate moisture induced short circuits, even when the surface is already wet or has been inundated.
- Insulates and protects devices securing long term faultless operation under adverse conditions.
- Has no adverse effect on standard plastics, rubber, glass, varnishes, ceramics or metals such as

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steel, stainless steel, iron, aluminium, copper, zinc, tin and brass and does not attack insulating varnishes.

- Extremely hydrophobic. Does not emulsify.
- Insensitive to weather and temperature extremes (Effective at -20°C - +130°C)
- Easy to use, simply spray the area and wait 2 - 3 minutes for it to take effect.
- Extremely hydrophobic
- High degree of penetration and capillary ability
- Maintains its elasticity (ideal for flexible parts)
- Contains no resins, silicone, acrylics, teflon or aromatic compounds

3 Applications

Nanoman Electrical + Circuits can be used for prevention, repairs and emergencies. Essentially anywhere, current leaks need to be suppressed, electrical contacts restored and/or where electrical short circuits problems to be eliminated

Nanoman Electrical + Circuits is suitable for use on all electrical equipment from 3 volts to 10,000 volts including mining, automotive, marine, agricultural, robotics, industrial and construction equipment.

Examples of use:

- Electric or electronic equipment located in high humidity areas (refrigerators and freezers)
- Electrical contacts, wires, motors, ignition systems, windings, fuses, switch gear, junction boxes and signalling installations that need moisture protection or insulation
- Electric circuit boards, connections and equipment (eg outdoor power points)
- Underground electrical installations
- Electrical and electronic components and systems that need to be protected from moisture and humidity and the damage it causes
- Boat motors and other mechanical/electrical marine equipment
- Building industry (electrical works) and construction equipment
- Automotive industry (engines, ignition and electrical systems)

4 Surface Preparation

For protection and prevention

For best long term protection all circuits, electrical components and PCB's they should be clean and free of contaminants prior to application. Use circuit manufacturer's cleaning recommendations and approved cleaners to avoid damaging the circuits or electrical components. To ensure maximum performance, it is important that the surface is completely clean, and free from dust and grease prior to application.

For repairs and circuit restoration

For restoring connectivity of circuits that have been effected by moisture or humidity including being inundated, unplug the device and turn off power to the equipment or device and wipe off any visible moisture. The item is then ready for treatment with Nanoman Electrical + Circuit.



5 Directions for Use

Nanoman Electrical + Circuit is a highly flexible protective coating that can be applied at ambient temperatures. Its application is extremely simple and is suitable for all the standard methods of application including dipping and spraying.

For emergency use and repairs we recommend spraying the effected equipment where moisture has penetrated or will penetrate to restore connectivity. Prior to treating the effected device unplug the power source and ensure power is switched off. Liberally spray or brush the effected area and circuits with Nanoman Electrical + Circuit. After spraying a surface with NANOMAN Universal the displacement of moisture commences almost immediately. Allow 2-3 minutes before electrical circuits before are switched on. The nano particles of the coating are transported to the smallest cavities and start taking effect after about two minutes and are fully stabilized and reach optimum performance after 10 minutes.

To protect equipment or PCB's prior to use or installation application can be easily and efficiently be performed by dip, spray or brush using relatively simple application equipment.

Spraying:

Nanoman Electrical + Circuit is suitable both for use in air spray guns and manual atomisers. A good technique is to hold the gun at 45 degrees angle and a distance of approximately 20-25cm while spraying. Spray a thin and continuous film onto the product with an even motion. Turn the circuit 90 degrees and repeat the process. Rotate a full 360 degrees to cover all sides of the product. This process helps to ensure penetration of the coating beneath the components and in confined spaces. Apply only one coat only

For large areas we recommend using a Using a high volume, low pressure (HVLP) spray gun with an approximately 1.4 size tip and the pressure set at approximately 25 psi.

When spraying enclosed work areas should always have appropriate ventilation. Never spray near any open source of ignition such as pilot light flames.

Dipping:

An appropriate size dipping tank / tray deep enough to cover the circuit or component being dipped. should be filled with Nanoman Electrical + Circuit. The item to be treated should be immersed in the vertical position, or at an angle as close to the vertical as possible. The product should then be withdrawn. After withdrawing, the product should be left to drain over the tank until the majority of residual coating has left the surface.

Brushing:

Nanoman Electrical + Circuit can be applied with a good quality brush. Care should be taken not to disturb the components or wiring. Curing is at ambient temperature, and coating and will be effective in 10-20 seconds and fully functional after 10 minutes.

Nanoman Electrical + Circuit is available in both retail and commercial quantities and is designed for use by both consumers and specialized technicians and manufacturers. You don't need to be an expert to apply the products. Comes with simple to follow instructions and it is quick and easy to apply.



Specific application instructions:

- The wearing of gloves is recommended.
- Shake bottle before applying to the surface to be protected.
- Do not apply to hot and/or live electrical circuits.
- Spray on the parts / surfaces to be protected.
- Product can also be applied by painting / brushing or dipping depending upon circumstances.
- Wait 2-3 minutes before using the component. Do not use when electric components are switched on.
- Recommended usage rate is 20-30mL/M2 .

Cautions

- DO NOT THIN. Shake contents thoroughly prior to use.
- Do not use with other waterproofing products.
- Apply in a dust-free environment to avoid surface contamination.
- Do not apply to live circuits
- Keep away from ignition sources

Working Conditions:

- The wearing of protective gloves/protective clothing/eye protection/face protection is recommended when using this product. Final choice of personal protective equipment will depend upon individual circumstances and/or according to risk assessments undertaken.
- Consult SDS for proper handling, clean-up, disposal, and use of personal protective equipment.
- Please ensure the area being treated is well ventilated.
- Avoid breathing in spray.
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- Store in a sealed container and keep away from children.
- Clean equipment immediately after using.
- Protection of adjacent porous areas from overspray and runoff is recommended but not necessary for non-porous surfaces.
- Ensure any overspray be wiped off adjacent with a dry cloth as soon as possible to avoid crystallisation.

6 Coverage

Consumption / coverage of Nanoman Electrical + Circuit is dependent upon the surface being coated (rough or smooth) and application technique. As a guide components to be treated or protected require a tin film application. This usually in the range of Approx 20-30 ml/m²

The durability of the coating is dependent on several factors including, the type of equipment or item that it is applied to and the mechanical stress applied to the surface.

For electrical circuits and items involving a low amount of mechanical stress, coating will last for up to 2 years before requiring reapplication. For mechanically working parts, coating will be effective for approximately 12 months.



7 Cure Time

After spraying a surface with Nanoman Electrical + Circuit the displacement of moisture commences almost immediately. Allow 2-3 minutes before electrical circuits before are switched on. The nano particles are transported to the smallest cavities and start taking effect after about two minutes and are fully stabilized and reach optimum performance after 10 minutes.

8 Physical Properties

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|----------------------|-----------------------|
| Form: | Liquid |
| Look: | Green/Brown |
| Odour | Characteristic |
| Rel. Density: | at 20°C: 0.842 kg/l • |
| Flashpoint: | >195 °C • |
| Ignition Temp. | ca. 370 °C |
| Explosive Properties | not applicable |
| Solubility in Water: | not soluble |
| Oxidising Properties | not applicable |
| Thinning: | Ready to use |
| Handling: | Refer to SDS |

By way of explanation the dielectric strength of Nanoman Electrical + Circuits is:

- Immediately; after spraying: 163 KV/cm
- 1 hour after spraying: 208 KV/cm
- 100 hours after spraying: 256 KV/cm
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Comparison values are:

- Air: 33 KV/cm
- Insulating oil: 120 KV/cm
- Glass: 140 KV/cm
- Porcelain: 200 KV/cm

KV/cm = A kilovolt per centimetre

9 Packaging

Nanoman Electrical + Circuits is available in the following pack sizes:

- 125ml, 250ml, with appropriate application sprayers
- 1L, 2L, 5L, 20L



10 Shelf Life and Storage

- Store in its sealed container and keep away from children.
- Unopened original containers can be stored for 2 years.
- Used/opened containers can be stored for approximately 12 months.
- Recommended storage and transport temperature: +5° to +25°C.
- Store in a cool and dry environment and out of direct sunlight.

11 Safety Instructions

The instructions on the Nanoman Electrical + Circuits Safety Data Sheet must always be followed.

- The wearing of gloves is recommended.
- Please ensure the area being treated is well ventilated.
- Avoid breathing fume/gas/mist/ vapours/spray.
- Store in a sealed container and keep away from children.
- In the event of eye contact, wash out immediately with cold water. Seek medical advice if necessary.
- Do not swallow. . Seek medical advice.
- If using outdoors avoid applying in windy conditions if possible.
- Wash hands after application
- Keep ignition sources away – Do not smoke
- Keep out of reach of children.

12 Surface Maintenance / Cleaning

With Nanoman Electrical + Circuits applied, there is no need for ongoing maintenance. Electrical and electronic equipment should be maintained in accordance with the equipment's specific specifications.

13 Disclaimer

The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. Users should satisfy themselves that it is suitable for their needs. The product can have a variety of different applications as well as differing application and working conditions in your environment that are beyond our control. As we cannot control or anticipate the conditions under which this product may be used, each user should review the information in specific context of the planned use. To the maximum extent permitted by law, Nanotech Products Pty Ltd will not be responsible for damages of any nature resulting from the use or reliance upon the information contained in this data sheet. No express or implied warranties are given other than those implied mandatory by law.

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