Tech Article

Ensure Contact Cleaner Compatibility with Today's Complex Electronics

Author: Emily Peck, MicroCare Senior Chemist
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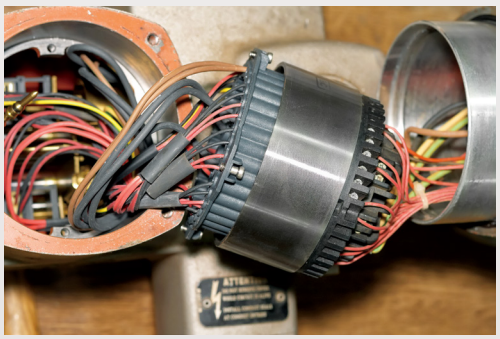

Contact cleaner refreshes electrical connections during repair work.

With modern electronics getting smaller and more complex, finding a reliable cleaning method that is both effective and compatible with the different materials of the electrical equipment can be a difficult task. The smallest contaminant can form a barrier between contacts and parts, or initiate dendritic growth affecting the device's efficiency and performance. This is why critical cleaning plays an important role in guaranteeing the quality of the electronic equipment coming off the production line.

A category of cleaners widely used in the industry due to its ease of use and convenience are contact cleaners. They clear particulate and oil residues from hard-to-reach places and refresh electrical connectivity on switches, relays, potentiometers and other devices. They safely rinse grit from hot motors and dust from inside electromechanical relays and keyboards.

They are also effective in removing contaminants from hard-to-reach areas on connectors, cable harnesses, tuners, power supplies, encoders, distribution panels, junction boxes and switching devices.

The perfect contact cleaner should be nonflammable, noncorrosive, and have strong dielectric properties. Ideally, it could even be sprayed on energized electrical circuits without concern. It is also very important that the cleaning agent is safe for use on all component materials without the risk of damaging any delicate parts. These features may be the ultimate contact cleaning combination, but some electronics manufacturers may not be taking enough time to check that the cleaners being used are up to the job and compatible on the electronic components.

First Step

Although the capability of the contact cleaner is important, so is its compatibility with the substrate being cleaned. When it comes to choosing the correct contact cleaner, first check for material compatibility. This is a critical area to investigate before any cleaning process is undertaken. Does the device consist of just one type of material or is it made up of several materials with vulnerable components? Perhaps it has an LCD display made from transparent polycarbonate, contains inks, or includes rubber parts that may be damaged by aggressive solvents

Think about what the electronics are made from. Many use a range of materials for their structure. One electronic component can be fiberglass while others can contain materials like copper, elastomers, or screen-printed parts. If you are unsure about the materials of construction, it is important to test before the widespread deployment of a cleaner.

Contact Cleaners

Quite often a strong cleaning fluid is used to ensure cleanliness. It delivers excellent results and cleans quickly. However, a cleaner that is too strong can potentially damage soft plastics, rubber, conformal coatings and even remove inks. It may appear to be a quick and effective solution to cleaning, but the unseen damage being caused can be destructive to the component materials.

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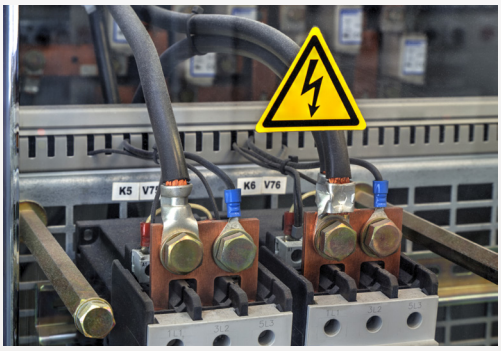
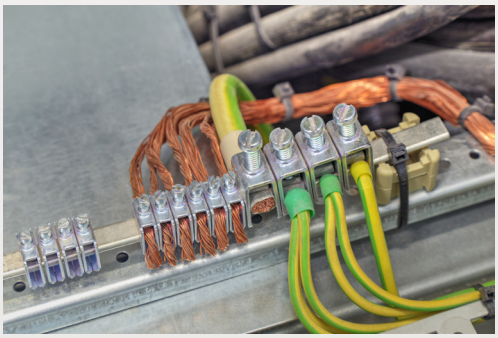


Ensure the contact cleaner is compatible with metals, plastics and inks.



Use contact cleaner on grounding terminals and other electric connections.

Contact cleaner should be able to be sprayed on energized electrical circuits without concern.

An effective and safe method of cleaning is through the use of modern contact cleaners. Modern contact cleaners are growing in popularity for their effectiveness and simplicity. They remove oxides and other unwanted contaminants from the conductive surfaces of switches, connectors and other electrical components with surface contacts. They are particularly useful if cleaning is required for assemblies with varying material use or those where component parts have not yet been established. Strong cleaners may dissolve, craze or attack softer substrates; therefore, a milder plastic-safe cleaner is often the preferred choice. It is also essential to check the contact cleaner is non-conductive, fast-drying and non-flammable as well as safe on all materials of construction.

There is a vast array of contact cleaners on the market, so it is important to choose one that cleans effectively, dries quickly, leaves no residue and is nonflammable for safety. In the past, some technicians may have used IPA (isopropyl alcohol) with some success for contact cleaning. However, IPA is slow-drying and is highly flammable, causing potential safety risks. In addition, oxides are typically not cleaned by IPA, so alcohol may not be the best choice. On the other hand, most modern contact cleaners, with their high volatility, dry quickly and without residue. They are also nonflammable so they can be used even on energized equipment.

Keep the Kb Value Low

If an electronic device is made from a variety of materials, and in particular includes plastic components, it is important to use a contact cleaner with a low Kauri Butanol (Kb) value. The cleaning strength of a contact cleaner is frequently measured by an industry benchmark called the Kb value. Stronger cleaning fluids with a high Kb value may have compatibility problems with soft plastics, coatings, inks and other components. Ideally, if delicate materials are within the device that requires cleaning, a low Kb value of between 15-40 is usually the safest. This Kb range indicates that the contact cleaner is mild and suitable for most surfaces.

Kb values can be found on the contact cleaner's technical data sheet. This will show a figure to allow you to gauge the cleaner's strength and suitability for the contaminant requiring removal. Cleaners with lower Kb values will remove greases but may not handle ionics and fluxes. Cleaners with higher Kb values may be speedy and effective but may attack plastic components. For this reason, it is important to consider the components to be cleaned and the materials of construction. Dependent on the contamination, make sure the contact cleaner is strong enough to remove the contamination and clean effectively, while not affecting the components themselves.

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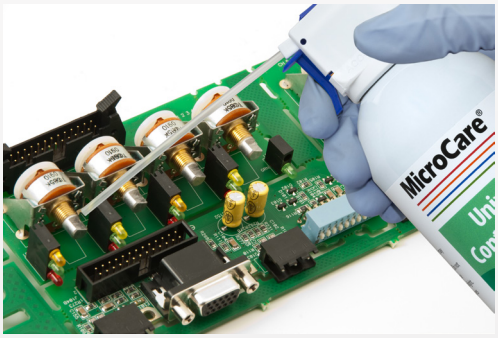

Contact cleaners flush away dust and lint from electronic equipment.

Cleaning Trials

A good method of ensuring the contact cleaner being used is working effectively without affecting a components' material is to conduct a 'cleaning trial' on a sacrificial or test part. The best practice is to start with a milder cleaner first and progressively try stronger cleaners until the optimal cleaning result is achieved. It is recommended that tests be performed in more than one area on the part to ensure it is safe for all the materials the cleaner may contact, either directly or indirectly. Leading suppliers of critical cleaning solutions have field engineers who can provide guidance on testing the cleaners and how to select the best one for the component and the contamination. Often, the results are unexpected: some mild cleaners may clean as well as or even better than those with much higher Kb values, with the added benefit of maintaining excellent material compatibility.

Many companies will conduct their own in-house cleaning trials, but in some instances, companies may send their sacrificial test parts to the cleaning fluid manufacturer for an in-lab cleaning assessment. Cleaning experiments are conducted on their parts and particular contamination to ensure effective cleaning with the fewest risk to their parts. The lab will typically present the company with a written report, including detailed recommendations on the best cleaner and cleaning methods to ensure both cleanliness and safety.

What is Out There?

There are many contact cleaners on the market which combine a number of important features. They clean effectively, are worker safe, environmentally-friendly and inexpensive. Although mild, they clean thoroughly and can rinse and flush away mineral and silicone oils, as well as removing dust, lint, grit and other particulates making electronics components clean and ready for the next stage in the manufacturing process.

When choosing a contact cleaner check its credentials. Not only does it need to clean well, but it has to work with the components it is being used on. It must be compatible with all materials of the assembly. Look at its Kb value checking it is low enough to be suitable for all surfaces. Is it non-flammable and can it safely clean a variety of electronic mechanisms from connectors and relays, to wiring harnesses and mechanical devices, all while the equipment is energized and operating? Does it have strong dielectric properties to prevent electrical shorting while the cleaner is drying? Importantly remember to also consider worker safety and environmental and regulatory compliance. There are modern contact cleaners on the market today that comply with strict air quality regulations and are formulated for to meet stringent safety requirements.

Also, do not overlook price point, the cleaner has to work within the budget. Perhaps consider the use of a controlled dispensing system that attaches to the contact cleaner. This method delivers faster and better cleaning, with less waste.

Ideally, contact the cleaning solution supplier and run cleaning trials on the electronics equipment. Partner with a critical cleaning expert who will help in selecting the right contact cleaning fluid, checking it cleans effectively and is compatible with all materials. They can recommend the best cleaning fluid and process improvements to achieve optimal cleaning results.

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About the Author:
Emily Peck is a Senior Chemist at MicroCare which offers benchtop and vapor degreasing critical cleaning solutions. She has been in the industry more than 6 years and holds a MS in Chemistry from Tufts University. Peck researches, develops and tests cleaning-related products that are used on a daily basis in electronics, medical, fiber optic and precision cleaning applications.
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