FINTEC
METAL FINISHING TECHNOLOGY

Comco Conformal Coating Removal Data Sheet

Conformal coatings can be broadly classified as either plastic or resin materials that are applied to electronic devices to protect them from various forms of contamination. There are times when these coatings must be removed, either entirely or in specific areas, because of a component failure, to expose a test point, or when older devices are returned from the field for repair.

Methods of Conformal Coating Removal including Micro-Abrasive Blasting

One of the most effective and safest methods to remove conformal coatings on delicate electronic devices is micro-abrasive blasting or "MicroBlasting". With micro-abrasive blasting, the task of removing conformal coating is fast, environmentally friendly, and cost-effective. It simplifies the selective removal of coatings while maintaining control over the process to eliminate damage to delicate components. Using MicroBlasting for conformal coating removal applications does not typically require highly trained personnel.

Conformal coatings can also be removed using mechanical, thermal, or chemical processes, but these methods introduce additional risks.

- Mechanical removal methods involve scraping, cutting, or grinding the coatings with anything from small, sharp knives to handheld grinders. These methods require highly trained operators, or the product could be irreparably damaged.
- Some conformal coatings can be burned away using a hot soldering iron. This method works quickly; however, there is a risk of damaging the device. Also, certain types of coatings will generate hazardous toxic fumes when heated.
- Chemical stripping is effective at removing many conformal coating materials but involves substantial lengths of time. Also, it is difficult to prevent the chemicals from leaching beneath the coating. Safety and environmental restrictions on storage and disposal of chemicals create additional concerns.

How Micro-Abrasive Blasting Works for Conformal Coating Removal

Microblasting works by uniformly mixing air with abrasive media then propelling the mixture out of a small nozzle tip at high velocity.

A board or component is held inside a workstation. The operator aims the nozzle at the area on the part where the coating needs to be removed. The operator depresses a footswitch to start the blast. As the operator moves the nozzle along the targeted area, the abrasive stream selectively cuts through the coating.

Comco's ProCenter Plus workstation, confines the spent abrasive media. A built-in HEPA-equipped dust collector extracts and stores spent abrasive efficiently. It also provides the operator with a work area that offers good lighting and excellent visibility. Because micro-abrasive blasting powders are extremely sensitive to moisture, the ProCenter Plus comes equipped with a desiccant air dryer.

Conformal Coating Removal

Abrasive Media

The type of abrasive powder used has the most significant impact on the blast's effectiveness. The size, hardness, and shape of the individual powder particles give each type of powder unique characteristics.

Walnut shell is a gentle abrasive that works well on all types of conformal coatings. The large particle size (250µ) enables walnut shell to cut most coatings quickly, but because it is a soft material, it is very forgiving of operator error. Walnut shell is both biodegradable and environmentally friendly.

Plastic media is similar in hardness to walnut shell, but the particles are slightly smaller (200µ). Blasting with plastic to remove coatings will generally take longer than with other abrasives. Plastic media does offer an advantage with some applications because it is treated to reduce electro-static discharge.

Sodium bicarbonate is one of the softest abrasives available, but the particles' needle-like or "monoclinic" shape makes it an excellent choice for abrading pliable materials. Sodium bicarbonate is recommended for hard, stubborn coatings, and it is water soluble so it is extremely easy to clean up.

Coating Type	Pressure (PSI)	Recommended Powder (Type)
Acrylic	50	Walnut Shell
Epoxy	40	Sodium Bicarbonate
Silicone	35	Sodium Bicarbonate
Parylene	30	Sodium Bicarbonate
Polyurethane	40	Sodium Bicarbonate
UV Epoxy	50	Plastic
UV Silicon	50	Plastic

Nozzles

The size of the nozzle opening is matched with the size of the powder to prevent clogging the nozzle and to ensure a smooth, consistent flow of the abrasive stream. A small, round opening produces a highly focused stream of abrasive, which gives the operator the most precise control. Most conformal coating removal applications use round nozzles with openings ranging from .018" to .060".

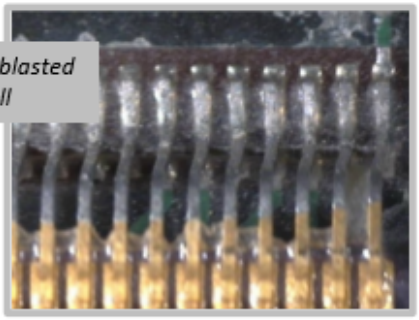
Nozzle angle and distance from the work piece, blast air pressure, and tank orifice opening size are additional elements that influence the force of the abrasive stream. Typically, when the work is to remove coatings from around a very small device, the operator will hold the nozzle 1/4" from the surface for maximum control.

The Right Mix

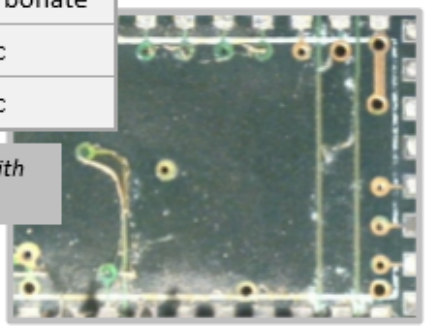
With a new application, all of these factors are tested with nozzle and powder selections. The formula that works best on a specific type of conformal coating removal application will be determined by:

1. The type of conformal coating to be removed.
2. The thickness of the coating.
3. The type of base product the coating is covering.

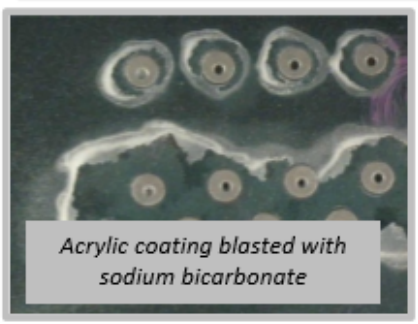
Once the correct combination is achieved, keeping these parameters constant is relatively easy – producing repeatable, consistent results.



Polyurethane coating blasted with walnut shell



Epoxy coating blasted with plastic media



Acrylic coating blasted with sodium bicarbonate

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Conformal Coating Removal

Quality Control and Electro-Static Discharge

Conformal coatings were originally developed to meet stringent military specifications. The same strict requirements apply to conformal coating removal methods. Because it is a reliable process and the results achieved by micro-abrasive blasting are so predictable, it is the process recommended and used by many military facilities and their contractors for conformal coating removal.

Military and industrial applications alike often involve devices that are sensitive to and can be damaged by exposure to electro-static discharge, or ESD. Unfortunately, all micro-abrasive blasting machines generate some static electricity. If this current is not conducted away, an ESD event (spark) can occur.

Blasting components that are vulnerable to damage from electro-static discharge should take place in a workstation equipped with special ESD controls. Several features for minimizing ESD in the micro-abrasive blasting environment have been developed. A system that utilizes a combination of preventative measures, like those on the Comco ESD Control ProCenter Plus will deliver the maximum protection.

ESD Control ProCenter Plus

The Comco ESD Control ProCenter Plus combines the workstation and dust collector into a single compact unit. It is equipped with an ionizer bar with a series of electrode probes that continuously emit a flow of charged ions into an air stream flowing out from around each of the probes. This flow of highly ionized air floods the ProCenter's work area and quickly neutralizes any surface charges.

To further reduce the build up of electro-static charges, the ProCenter Plus includes the following accessories for grounding the nozzle and work piece: edge-connector grounding bar, needle probe, grounded handpiece and conductive nozzles. The operator should wear a grounding wrist strap to protect both the device and the operator.

CTR201-1	115V/60Hz, 4 amp, 180 lbs.
CTR201-2	230V/50Hz, 4 amp, 180 lbs.
Dimensions	30" Wide x 46" High x 34" Deep
Interior Space	2.2 ft.^{3} 24" Wide x 10" High x 14" Deep
Window	Tempered glass opening (hinged) 23" x 11"
Lighting	18-Watt black fluorescent lights (2)

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