

# Operator's Manual

## Microbicide® TC-320

# Electrostatic Sprayer System

Microbicide® TC-320 Electrostatic Sprayer Operator's Manual



Microbicide® Electrostatic Sprayer Systems – All Rights Reserved

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# CONGRATULATIONS!

You are now operating one of the most advanced electrostatic spraying systems on the market today. The **Microbicide**® TC-320 Electrostatic Sprayer provides you a highly efficient, cost effective nano coating capability and a compact, powerful sprayer system that is easy to operate and maintain.

If you have any requirements or suggestions regarding our products or service please contact us at:

**World Changing Technologies Pte Ltd**  
8 Burn Road  
#08-02/03 Trivex  
Singapore 369977  
Phone: (65) 6449 3928  
service@wctinfo.com

Please take time to read this manual before operating the **Microbicide**® TC-320 Electrostatic Sprayer. The manual contains important instructions for the safe operation of this equipment. It also includes helpful suggestions to maximize productive use of the **Microbicide**® TC-320. Essential cleaning instructions should be followed to maintain your system at peak efficiency. Please carefully read and follow all instructions for your own safety and the safety of others around you.

Thank you!

We appreciate your business and are proud that you have selected a **Microbicide**® electrostatic sprayer for your nano coating operations.

The **Microbicide**® TC-320 has been thoroughly tested and calibrated. If you have any problems with it, please get in touch with us immediately. We will be glad to answer any questions you have concerning equipment or service. We appreciate your business and sincerely hope that **Microbicide**® electrostatic sprayers can meet your present and future nano coating needs.



For your personal records  
Use the following to record  
important information of your  
system.

TC-320 220VAC

Model #

Serial #

Spraygun serial number

Date of purchase.

Trademarks and brand names shown are the property of their respective owners.

# IMPORTANT INFORMATION

1. **CLEANING:** The trolley case, spraygun and hose should be cleaned and rinsed with water regularly, and if necessary even each day after use. Failure to clean these on a regular basis will cause the system to malfunction and could negate the warranty. Even clear or green solutions will tend to collect and clog the filter, hoses, connectors and spraygun.
2. **AIR FILTERS:** The air filter on the compressor must be checked each week and if clogged it must be cleaned. Failure to clean the compressor air filter will cause problems with air pressure and possible hose failure.
3. **SLIGHT SHOCK:** Be aware that with an electrostatic sprayer, the operator may experience a slight shock.
4. **NOZZLE DRIP:** The nozzle will drip at times due to the accumulation of charged droplets.
5. **LED LIGHT:** If the LED on the handle of the spraygun is not lit, it indicates the spray is not receiving an electrostatic charge. On rare occasions the light may be burned out. Check to ensure the batteries are properly charged.
6. **COMPRESSOR HEAT:** The compressor will heat up with use. It is recommended the TC-320 be turned off every couple of hours and allowed to cool down.
7. **AIR LINE HEAT:** The pressurized air lines will heat up. They can become very hot to the touch, exercise caution when handling the air lines.
8. **COLD TEMPERATURES:** The nozzle can freeze up when ambient temperature is less than 10<sup>0</sup> C (50<sup>0</sup> F).
9. **BATTERIES:** Ensure the batteries are charged. Fully charged batteries will provide approximately five (5 hrs) hours of continuous use. If in doubt remove the cover from the spraygun battery compartment and temporarily replace the two rechargeable 9-volt batteries with regular 9-volt batteries for testing purposes only! **CAUTION:** Remove the regular batteries and replace with new 9-volt rechargeable batteries before plugging the spraygun into the charger.
10. **TROUBLESHOOTING:** There is a troubleshooting guide included in this manual. Refer to the Table of Contents for the guide.

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## Overview - Microbicide® Electrostatic Sprayer System Technology

**Microbicide®** electrostatic sprayers incorporate induction charging nozzle technology. The **Microbicide®** TC-320 electrostatic sprayer produces electrically charged spray droplets that are carried to a target in a low pressure, gentle, air stream.

Air and liquid enter separately at the rear of the nozzle. Just before leaving the nozzle, the air hits the liquid stream to make many thousands of tiny spray droplets that pass through the charging ring.

An electrical charge is applied to the spray droplets by the charging ring. The charged spray droplets are blown out of the nozzle and move onto the target where they are attracted to surfaces by electrostatic forces.

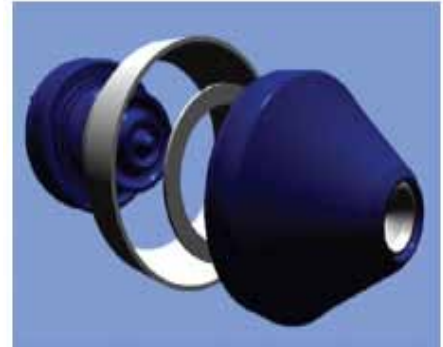
The electrostatic charge induced by the induction charged nozzle is strong enough to allow the droplets to move in any direction to cover surfaces, even defying gravity to coat the back side of target objects and the underside of leaves.

The result is uniform coverage on hidden surfaces that other applicators miss. Air-assisted electrostatic sprayers give more than twice the deposition efficiency of hydraulic sprayers and non-electrostatic types of air-assisted sprayers.

The operator benefits in terms of significant reductions in application costs and optimized nano coating coverage, sanitization, insect and disease control or other coverage.

The induction charged nozzle is easy to clean and corrosion-proof. The interior ceramic outlet resists wear three times better than stainless steel outlets.

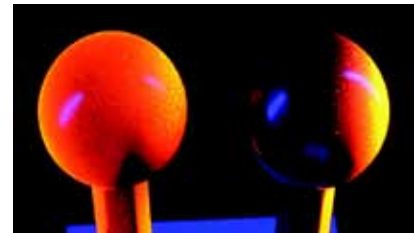
These features combine to give the best nano coating coverage on the market. This quality product is virtually maintenance-free, and assures you of savings in the application of chemical.



The induction charged spray nozzle is what makes **Microbicide®** electrostatic sprayers the industry leader in electrostatic applications.

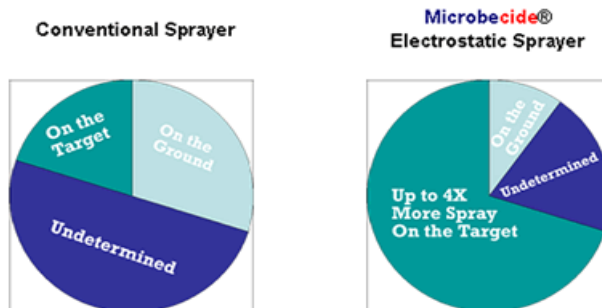


Electrostatically charged droplets are attracted to plant surfaces.



A picture is worth a thousand words... In this test, fluorescent dye has been sprayed on two round knobs. The left knob was sprayed with the electrostatic system ON; the right knob was sprayed with the same applicator, but with the electrostatic system OFF. Note how even the coverage is on the left knob with electrostatics ON.

### Where Does The Spray Go?



The University of California completed a series of tests to investigate what happens to spray liquid after it leaves the nozzle.

Conclusion: Electrostatic technology places over 4 times the amount of coating onto target surfaces using ½ the amount of solution. **Microbicide®** electrostatic sprayers send 2/3 less solution to the ground and into the air. Less solution used overall, less waste and less drift than conventional equipment. Improved operator productivity and significant cost savings!

**Microbicide®** Electrostatic Sprayer Systems

8 Burn Road #08-02/03 Trivex Singapore 369977 • Tel: (65) 6449 3928 • Website: [microbicidesprayer.com](http://microbicidesprayer.com)  
Company Reg No. 200613162Z

## OPERATOR'S RESPONSIBILITY

*Read the Owner's Manual.*

It is the responsibility of the operator to read the Operator's Manual, to understand the safe and correct operating procedures which pertain to the operation of the product, and to maintain the product according to the Operator's Manual.

It is the operator's responsibility to ensure that all who are using this equipment read this manual.

The operator is responsible for inspecting the equipment and for repairing and replacing damaged or worn parts to prevent damage or excessive wear to other parts.

It is the operator's responsibility to deliver the machine for service or replacement of defective parts which are covered by the standard warranty.

Lack of attention to safety can result in reduction of efficiency, accident, personal injury, or death.

Watch for safety hazards and correct deficiencies promptly.

Use the following safety precautions as a guide when using this applicator.

### Operator's Responsibility

- ▶ Read the Operator's Manual. Failure to read the manual is considered a misuse of the equipment.
- ▶ Use the **Microbicide**® TC-320 Electrostatic Sprayer ONLY for its intended use as described in this manual.
- ▶ Do not allow a child to operate the **Microbicide**® TC-320. Do not allow adults to operate the **Microbicide**® TC-320 without proper instruction.
- ▶ Use extra care when applying nano coatings on stairs. Do not place the **Microbicide**® TC-320 on stairs.
- ▶ Store the **Microbicide**® TC-320 in a dry place. Do not expose to freezing temperatures.

## Caution: Shock Hazard

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### BE SAFETY CONSCIOUS!

Follow safety procedures for electrical equipment and tools.

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## CAUTION: SHOCK HAZARD

The **Microbicide®** TC-320 has been engineered to be very safe during normal operation. However, as with all line-powered electrical equipment and tools, certain safety procedures need to be followed.

- ▶ Use a GFCI (Ground Fault Circuit Interrupter) power outlet whenever possible.
- ▶ If an extension cord is necessary, use a three-wire extension cord with a 3-prong grounding type plug.
- ▶ Turn off applicator before unplugging.
- ▶ Unplug the **Microbicide®** TC-320 when not in use.
- ▶ Always unplug by grasping the plug. Do not unplug by pulling on the cord.
- ▶ Never pull plug with wet hands.
- ▶ Do not pull or carry the **Microbicide®** TC-320 by its power cord.
- ▶ Do not crimp the cord or cause it to be damaged by straining it around sharp edges.
- ▶ Keep power cord away from heat sources.
- ▶ Do not use the **Microbicide®** TC-320 with a damaged power cord. Call us for a replacement.

## Caution: Hot Surface

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### COMPRESSOR IS HOT!

The sprayer's compressor becomes hot during normal operation.

DO NOT TOUCH.

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## CAUTION: HOT SURFACE

**Be aware that the compressor of the applicator becomes hot enough to burn you.**

- ▶ The compressor becomes hot to the touch during normal use. Do not touch the **Microbicide®** TC-320's compressor after it has been running.
- ▶ Stay clear of the hot compressor when making adjustments inside the **Microbicide®** TC-320's case.
- ▶ The **Microbicide®** TC-320's compressor is equipped with a thermal overload switch. If it overheats, the compressor will stop running. Unplug the **Microbicide®** TC-320 and let it stand for one hour with the door open. The unit should then be able to restart.

## Caution: Chemical Safety Precautions

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### PROTECT YOUR LUNGS PROTECT YOUR EYES

*READ AND FOLLOW THE  
CHEMICAL MANUFACTURER'S  
INSTRUCTIONS CAREFULLY.*

*Follow all manufacturers'  
recommended chemical safety  
precautions.*

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# CHEMICAL SAFETY PRECAUTIONS

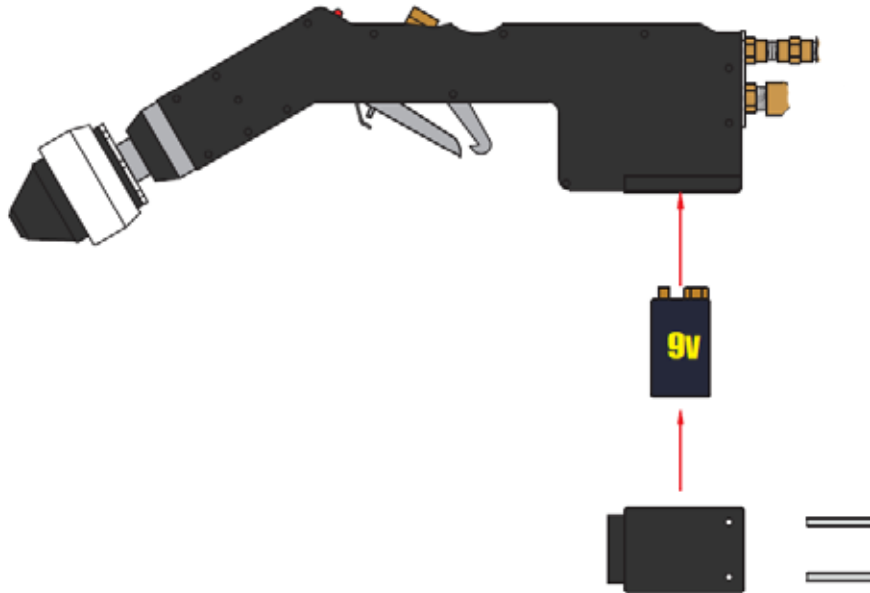
**Read and follow all instructions on the chemical or pesticide manufacturer's label.**

- ▶ Use protective clothing, eye protection and gloves when mixing chemicals to be applied with the **Microbicide**® TC-320.
- ▶ Always use a respirator and eye protection when applying nano coatings.
- ▶ Follow the chemical manufacturer's recommendations in handling, mixing, applying, storing and disposing of chemicals.
- ▶ Be aware of decontamination methods in case a person, clothing, or equipment is accidentally sprayed.
- ▶ Be aware of poisoning symptoms and know the appropriate first aid.
- ▶ Know the length of time needed to pass before allowing people and pets to go back into the sprayed area.

## About the **Microbicide**® TC-320 Electrostatic Sprayer System low-voltage spraygun

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For operator safety, the power supply for the **Microbicide**® TC-320 electrostatic spraygun is separate from the power supply for the **Microbicide**® TC-320's compressor. The spraygun is powered by 9-volt batteries in the handle of the spraygun. This low-voltage charge is not enough to harm an operator.



Occasionally a slight “tingling” or mild shock may be felt when applying a nano coating in an enclosed area. These static shocks, although sometimes unpleasant, are **not at all** dangerous to operators. When charged particles are directed onto other objects, some of the charge gets on the operator, or else an opposite charge may be drawn up from the ground, depending on the circumstances.

To minimize static discharges, make sure that the **Microbicide**® TC-320 is properly grounded. The **Microbicide**® TC-320 has a short stainless steel chain attached to the bottom of its housing. It is important that this chain touch the floor during use. If the chain is broken or missing, replace it.

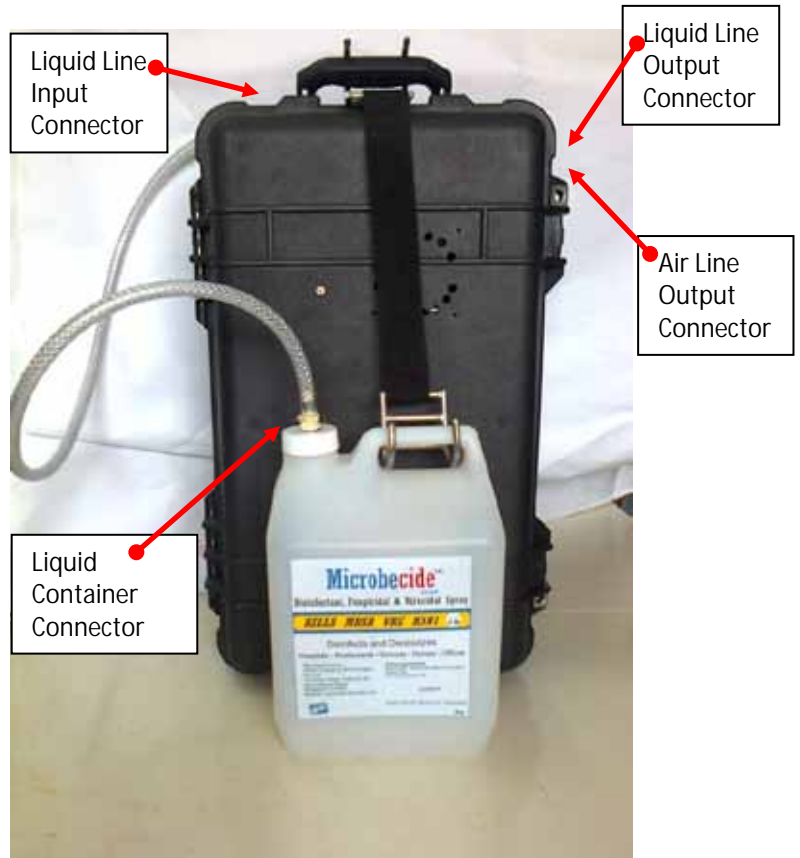
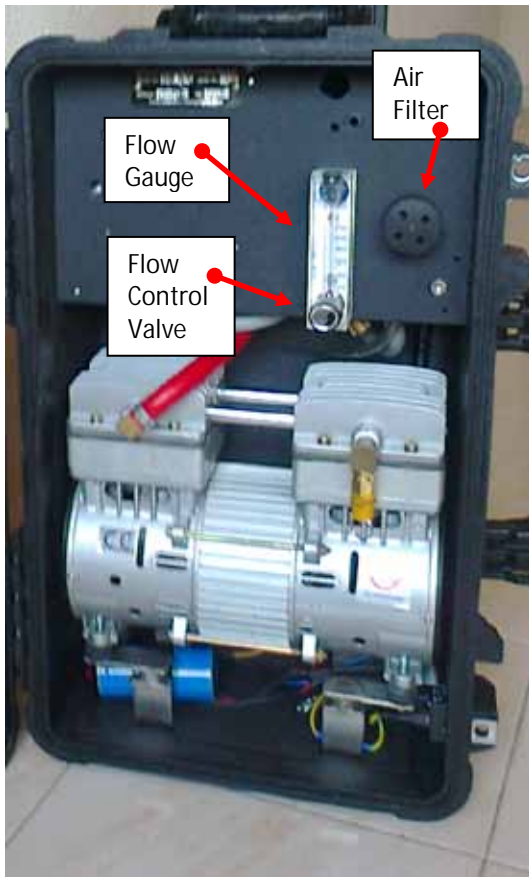
Try misting the floor of the room or greenhouse with plain water before applying nano coatings.

Pay attention to the exact conditions in which the shocks happen. Operators may find that they can prevent them by maintaining contact with the metal trigger of the **Microbicide**® TC-320 spraygun, rather than just holding its plastic body. If the shocks happen only when an operator subsequently touches a piece of equipment, try touching a painted or plastic part of it before touching metal.

Also the operator may try wearing a different type of shoe. Leather will conduct better than rubberized soles and may lessen the problem.

Operators should avoid touching sensitive electronic equipment such as computers, printers, or cell phones while operating the **Microbicide**® TC-320, a static discharge could damage sensitive electronic equipment.

# Air Intake Filter, Flow Rate Gauge, Flow Regulator Control Valve, Liquid Line Input Connector, Air & Liquid Line Output Connectors



## Cautions:

### KEEP FILTERS CLEAN!

The number one cause of poor sprayer performance is a clogged or dirty filter.

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We recommend you use an outlet with a **Ground-Fault Circuit Interrupter (GFCI)**.

**Do not operate the TC-320 in standing water.**

**Do not immerse the TC-320's compressor.**

**The TC-320's compressor becomes hot enough to burn during normal operation. DO NOT TOUCH.**

## Setting the Flow Rate

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The flow rate setting is determined by:

1. Coverage Desired (the amount of coating material you desire to apply to a given area)
2. Operator Speed (the time required for an operator to spray a given area. An experienced operator can adequately spray one square meter in 3 seconds)

As an example, suppose you wish a flow rate setting to apply one litre of material to cover 200 square meters of area (5ml of nano coating material per square meter).

Using the Flow Rate Table on our website

<http://www.microbecidesprayer.com>, find the square meters desired to be covered per litre of coating material or the desired amount of coating material to be applied per square meter.

Read across to the flow gauge setting. With the TC-320 spraygun trigger engaged (liquid spraying from the nozzle) adjust the flow rate regulator to the desired setting. For this example, set the flow rate to 100. At a setting of 100, coverage will be 200 square meters covered per one litre of coating material at a spraying time of 10 minutes.

With a flow regulator setting of 100, a skilled operator can apply a 5ml/sqm nano coating to an area of 1,200 square meters in one hour.

The flow rate can be adjusted to meet your desired coverage.

Other factors to consider could be operator experience, label recommendations or particular coatings.

Because electrostatic spraying is a much more effective coating method, we recommend you experiment to find the optimum coating coverage.

### Quick List: Operating Instructions Steps for Operation

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1. Prepare the coating liquid to be applied.
2. Connect the liquid input line to the liquid container.
3. Connect the liquid input line to the liquid input connector at the sprayer.
4. Connect the twin line hose to the liquid and air output connectors at the sprayer.
5. Connect the twin line hose to the liquid and air connectors on the spraygun.
6. Plug the power cord into an appropriate receptacle.  
Turn on the air compressor.
7. Engage the trigger and allow sprayer to draw coating liquid to spraygun nozzle.
8. Observe flow rate gauge and adjust flow rate control valve to desired rate of flow.

### Conduct a jar test

Needed:

- § Solutions of chemicals in approximate dilutions
- § Jar with lid
- § Gloves and Safety Glasses

After mixing solutions of the desired chemicals, place them in a large jar, cap it securely, and shake vigorously.

Carefully observe the interaction between the chemical compounds. If the water becomes milky or cloudy, the combined solution may plug the nozzles.

Let the jar sit for one to two hours. If there is precipitate (particles) on the bottom of the jar, then seek another combination of chemicals.

9. Begin spraying operations.

## **Thermal overload switch**

The **Microbicide**® TC-320's compressor has a built-in thermal overload switch. If the compressor overheats, the compressor will cut off. If this should happen, let the unit cool for one hour with the case open.

## **Quick List: To clean the **Microbicide**® TC-320 Electrostatic Sprayer System after operation:**

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1. Clean the exterior of the **Microbicide**® TC-320's trolley case with a damp cloth.
2. Fill liquid container with  $\frac{1}{2}$  to  $\frac{3}{4}$  gallon (1 to 2 liters) of clean water.
3. Turn on the air compressor and engage the trigger to flush the spraygun lines with the clean water. Check the nozzle for a good spray pattern while flushing. Allow air to flow for 30 seconds after the water has been sprayed.
4. Apply lubricating grease to all quick connect fittings. Lubricating grease can be ordered from our website. [Click here](#) for ordering lubricating grease. Detailed instructions on maintaining each of the **Microbicide**® TC-320's components follow in the next sections.

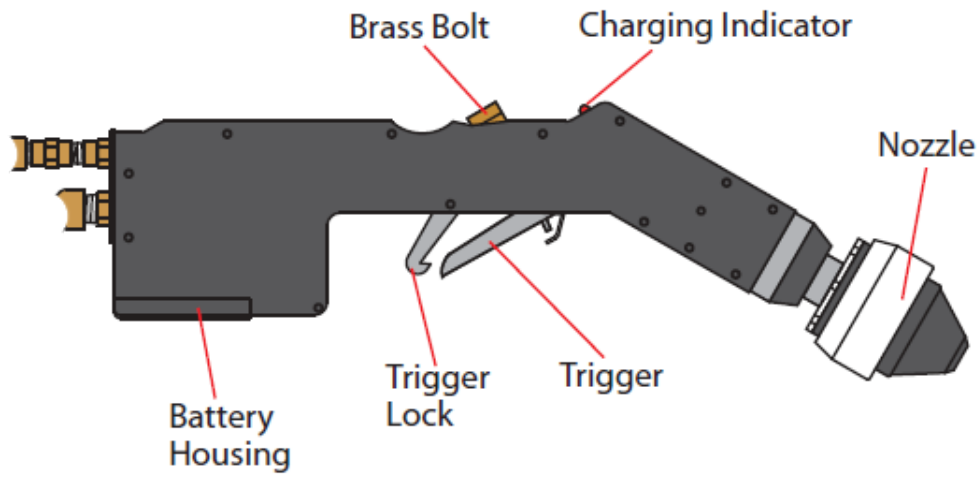
## The Spraygun

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The spraygun is held by the operator when applying a nano coating. Activation of the trigger causes the coating solution to be directed toward the target. User serviceable parts of the spraygun are the nozzle assembly, and the batteries. Except for the batteries, which are accessed by removing the battery cover, nothing inside the spraygun shell is user-serviceable.

**Do not open the spraygun shell;** doing so will void the warranty on the spraygun.

**NOTE**

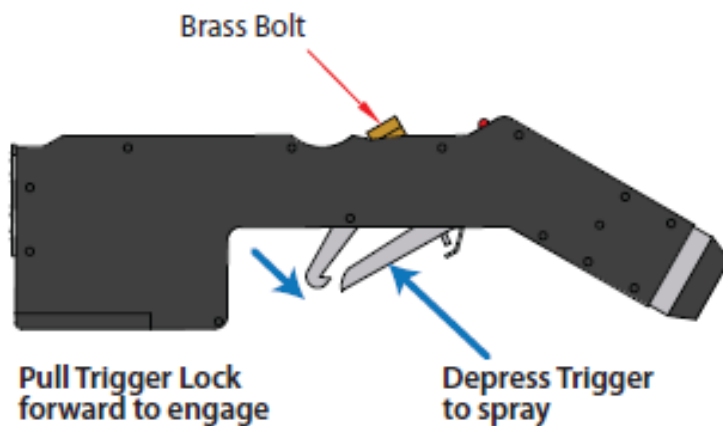


See also:      Changing the batteries  
                    Yearly spraygun service  
                    Application technique

## Trigger

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The trigger controls the on and off application of the nano coating solution. It can be continuously held on for operation or it can be locked in place.



### To engage/disengage the trigger:

1. Depress the trigger up towards the body of the spraygun to start applying a coating.
2. For continuous application, either keep holding the trigger or lock it in place by pulling up the lock and hooking the trigger.
3. To stop applying when the trigger is not locked, let go of the trigger.

### To clean the trigger:

1. Unthread the brass bolt on the top of the spraygun with a 5/8" socket wrench.
2. Be careful not to lose the spring, plunger, copper washer, and small brass bushing inside the trigger. Note how they fit inside so they may be replaced properly.
3. Check inside the trigger for blockage. Clean out any debris with compressed air or warm, soapy water.
4. Replace the spring and plunger; rethread the brass bolt into the top of the spraygun until tight.

## Nozzle assembly

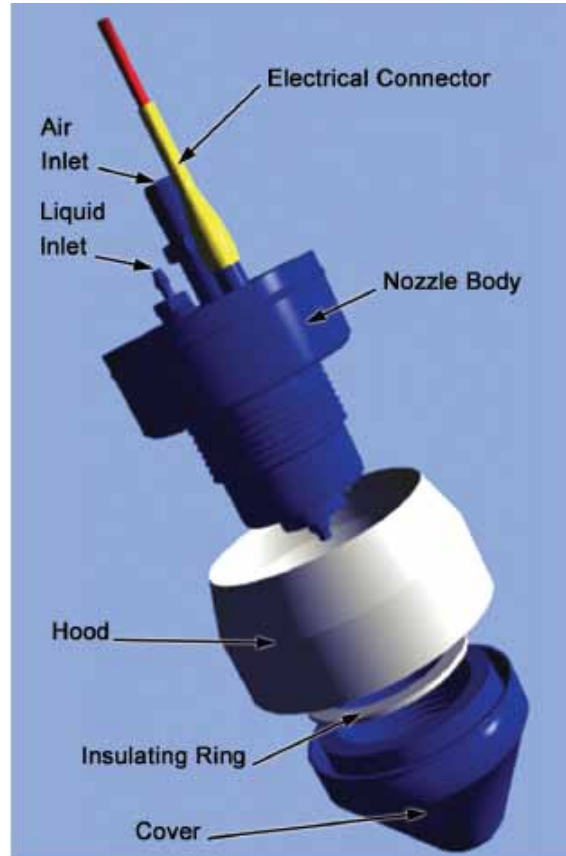
It is very important to follow all the maintenance and cleaning procedures to ensure the **Microbicide®** TC-320 will function properly. Although the induction charging nozzle will outperform all electrostatic spray technology on the market, regular cleaning will ensure peak operating performance.

The nozzle assembly is located at the end of the spraygun wand. It is composed of a nozzle body, internal o-ring, Teflon ring, cover, external o-ring, and a hood (see labeled drawing at right). To access the nozzle components, just unscrew the nozzle cover by hand.

### Cleaning the spraygun

Always rinse the spraygun out with clean soapy water after every day's operation. That is the most important thing you can do to ensure trouble free operation of the **Microbicide®** TC-320. By cleaning after each and every working day you will avoid the long-term chemical buildup that eventually causes clogs, poor spray patterns and shortens nozzle life.

Establish maintenance intervals to disassemble and clean the nozzle. Your nozzle maintenance schedule will vary depending on the types of chemicals used and adherence to pre- and post-spray checks. In general it is sufficient to thoroughly clean nozzles every 50 hours. If heavy loads of wettable powders are used, the cleaning schedule should be sooner.



## To clean the nozzle assembly

1. Slide the hood over the nozzle cover.
2. Unscrew the cover from the nozzle base and remove the Teflon ring. Clean any debris from around the nozzle tip.

**Note:** There is a small o-ring in the nozzle around the base of the tip – take care that it doesn't fall off. If it does, clean it and press back into place. Also, take care not to damage the nozzle tip when the cover is removed.

3. Soak the ring, cover, and hood in a mild detergent solution. Use a small brush (soft or mild bristle) to clean the inside of the cover and the hole through it. Also, be sure to clean the hood. It is important to clean inside the hood and the two cavities. Rinse thoroughly.
4. Scrub the nozzle base with the detergent solution using a soft bristle brush. Clean the ceramic outlet. Be sure to thoroughly clean the base cavity and take care not to damage the nozzle tip. Rinse and make sure the small o-ring is in place.
5. Reassemble nozzle by placing the Teflon ring on the base and screwing the cover on **hand tight**. Next, slide the hood over the nozzle and seat it securely against the external o-ring. Wipe clean the exterior of all hoses and fittings connected to the nozzle. **The electrode cover should be hand tight. Never use pliers or other tools to tighten it. The insulating ring should be loose.**

## Pre-Application Check

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1. Inspect Nozzle

Check nozzle cover to make sure it is on hand tight (do not over tighten or use a wrench). Make sure the hood is seated firmly to the nozzle base and against the external o-ring.

2. Preparing the Coating Solution

If you will be spraying wettable powders it is a good idea to use a compatibility agent with the water and coating mix. Compatibility agents are chemicals mixed with the water that make mixing easier and keeps heavy concentrations uniformly in suspension.

## Post-Application Check

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After each application it is essential that hoses and the spraygun be flushed with clean soapy water. This will help prevent solution build-up that can clog the liquid line and nozzle. Also, it is recommended that the nozzle exterior (black portion of nozzle) and nozzle hood be cleaned with soapy water at this time.

## The air & liquid delivery system

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### The air compressor

The air compressor produces compressed air which atomizes and propels the coating liquid. It plugs into a 220 volt electrical source. Use the **Microbicide**® TC-320 with an extension cord of no more than 50 feet and rated for no less than 10 amp service. The On/Off switch is on the top of the case.

### Cautions:

The **Microbicide**® TC-320's compressor becomes hot during normal operation. **DO NOT TOUCH.**

The compressor has a built-in thermal overload switch. If the **Microbicide**® TC-320 overheats, the compressor will cut off. If this should happen, let the unit cool for one hour with the case open.



## Liquid and Air Line Thumb Push Connects

There are 3 chromed thumb push connectors at the **Microbicide**® TC-320 trolley case and 2 chromed thumb push connectors at the spraygun.

1. Container Liquid Line Input Connector (on the top or left side of the case)
2. Liquid Line Output Connector (on the top or right side of the case)
3. Air Line Output Connector (on the top or right side of the case)
4. Spraygun Liquid Line Input Connector (at spraygun)
5. Spraygun Air Line Input Connector (at spraygun)

### **To connect the quick connects of the **Microbicide**® TC-320:**

1. Push the liquid and air plugs into their respective sockets until you feel it latch. They are different sizes and cannot be cross-connected.
2. Pull gently to make sure it is properly seated.

### **To disconnect the quick connects of the **Microbicide**® TC-320:**

1. Push the latch at the side of the socket to release the plug.
2. Pull the plug out of the socket.



## Batteries

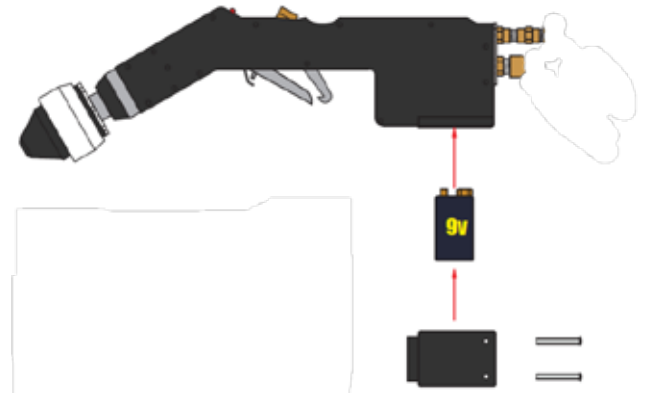
The induction charging nozzle operates on two 9-volt rechargeable batteries which are located in the base of the spraygun. In average conditions, the batteries will last 10 to 15 hours of operation on a charge. They should be recharged when the charging indicator on top of the spraygun shell doesn't glow when air is going through the spraygun.

After approximately 800 to 1000 hours of service the battery pack will no longer be able to hold an adequate charge and will need to be replaced. Replace with Nickel-Hydride rechargeable batteries. Order a Replacement Battery Pack from us, S/N # 4512.

*Remember to charge the  
spraygun batteries after  
every work session!*

## To change the batteries:

1. Unscrew the two 6-32 x ½" Phillips head machine screws which hold the battery cover in place.
2. While holding the leads in one hand, gently disconnect the batteries from the leads. Be careful not to tear the leads off the wires or tear the lead wires out of the power supply.
3. Connect the fresh battery pack to the leads.
4. Replace the battery cover. Screw the two 6-32 x ½" Phillips head machine screws back in to secure the battery cover.
5. Charge the spraygun before attempting to use it.



## Yearly spraygun services

For a service charge plus the cost of replacement parts, we will thoroughly clean the spraygun, replace any worn parts and recalibrate the electronics and nozzle. The Yearly Service also extends the spraygun warranty for another year. Consistent yearly service will increase spraying performance and prolong the life of your spraygun.

Bring the spraygun in to our office in Singapore or contact us to schedule spraygun services. If shipping the spraygun to us, package the spraygun securely since it can be damaged in shipment. Ship the spraygun in its original packing material if possible. If the original packing is not available, wrap the spraygun in bubble wrap, place it in a strong cardboard box and surround the gun handle with foam packing. Include a return shipping address and a telephone number.

Ship the spraygun to:

**World Changing Technologies Pte Ltd**  
8 Burn Road  
#08-02/03 Trivex  
Singapore 369977  
Tel: (65) 6449 3928  
e-mail: [service@wctinfo.com](mailto:service@wctinfo.com)

If any parts need to be replaced, we will contact you for authorization before replacement. Upon completion of servicing, the spraygun will be returned to you. Shipping charges will apply to spraygun return.

Payment for servicing may be by TT, bank draft, company check or credit card. We accept PayPal and process all credit card transactions through PayPal.

*As an additional benefit,  
Yearly Spraygun Service  
"turns back the clock" – the  
original 1-Year Warranty on  
the spraygun is renewed for  
another year!*

*Yet another good reason to  
send your spraygun in for  
factory-authorized service!*



# Applying nano coatings with the **Microbicide®** TC-320 Electrostatic Sprayer

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*Note: When using unfamiliar equipment or chemicals, always test on a small area before treating the entire surface. Do not use a chemical with the **Microbicide®** TC-320 if the label prohibits use in low-volume applicators.*

## Application Technique

As in spray painting, the goal is to achieve even coverage over the surface. The **Microbicide®** TC-320 is designed to help you do just that – by controlling the flow rate of coating liquid and by propelling the coating solution with a gentle air flow - you can stay well away from the target surface and let the electrostatic attraction do the rest of the work.

**Please note:** *The nano coating droplets are very, very fine - about 40 microns each. If you are used to working with a conventional applicator, you may make the mistake of thinking the target is not wet enough because you do not see large beads of liquid. In fact, after a pass with the spraygun, the surface of the target should just barely glisten with moisture. The fine droplets will evaporate quickly.*

Here are some tips to achieve the best possible coverage with the **Microbicide®** TC-320.

1. Before each job, ensure that the **Microbicide®** TC-320 is in good working order (see the pre-applicator checklist in this manual).
2. The optimal distance from the target surface is at least 18 inches away; however 36 to 48 inches may provide a more even coating. This gives the charged mist space to develop into a chaotic cloud that will be attracted to the target surface.
3. Hold the spraygun at right angles to the target surface. Starting at the highest point and using zig-zag horizontal strokes about 1 meter (3 ft.) wide, apply the nano coating down to the lowest point. Try to have each stroke overlap the previous stroke by about 50%.
4. You can use vertical strokes if it suits the area better. Just make sure to work in a methodical pattern and let your strokes overlap.
5. When moving to the next section, allow it to overlap the previous section by a few centimeters. Do not leave a gap.
6. The target surface should just barely glisten with the nano coating. Do not over-saturate the surface; if you see runs or puddles it means you are wasting coating. Do check to make sure the newly-coated surface is very slightly damp.
7. Be careful to keep the spraygun barrel as level as possible. If you allow the nozzle to point down too much, it may drip occasionally.
8. Unlike spray painting, you don't have to stop the application on every return stroke. Just engage the trigger lock and concentrate on the regular pattern of coating. Periodically check to make sure the red light is illuminated on the spraygun.



## A note about operating temperatures

The **Microbicide**® TC-320 electrostatic sprayer should always be operated at temperatures above 10° Celsius (50° Fahrenheit). When the ambient temperature is colder than this, the evaporative cooling caused as the solution is atomized will freeze the nozzle opening. Nozzle freeze-up can also occur when the liquid to be applied is colder than 10° C (50° F).

### IMPORTANT

*Water temperature must be at least 10° C (50°F). When the liquid and air meet in the nozzle, the temperature of the liquid decreases. As a result, water at temperatures below 10° C (50°F) may freeze and clog the nozzle.*

## Troubleshooting

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### TC-320 will not turn on:

- ☑ Is the TC-320 plugged in securely to the socket and the case?
- ☑ Is the electrical outlet faulty?
  - § Try a different outlet.
- ☑ Is the GFCI (Ground Fault Circuit Interrupter) set properly?
  - § Reset if necessary.
- ☑ Has the compressor overheated?
  - § Be careful, it may be hot.
  - § Let the TC-320 cool with the case open.
  - § Try again in about one hour.

### Spray quality problems:

- ☑ The TC-320 and filters should be cleaned and rinsed with water each day after use.
- ☑ Check that all hose “quick connections” are connected.
- ☑ 2 from hose to handgun
- ☑ 2 from hose to case
- ☑ Is the compressor air filter clogged?
- ☑ Is the nozzle cover dirty?
  - ☑ Unscrew the nozzle cover.
  - ☑ Wash inside nozzle cover with water.
- ☑ Check to see if liquid port is clogged. Clean out with paper clip or small wire.
- ☑ Is the trigger mechanism dirty?
  - ☑ Read manual and clean.
- ☑ Is the liquid or ambient temperature too cold?
- ☑ The nozzle can freeze up when the ambient temperature or the solution is less than 50°.

### Charging Light will not come on:

- ☑ If the red LED on the handle of the spray gun does not come on, it indicates that the spray is not receiving an electrostatic charge.
- ☑ Make sure the batteries are charged.
- ☑ Fully charged batteries will last for 5 - 8 continuous hours of use.
- ☑ Replace the rechargeable batteries with new ones when necessary.

### More help is available

- ☑ Also see the “Troubleshooting Guide” in the Operator's Manual.
- ☑ If you are still experiencing problems after exhausting the troubleshooting guides, please call World Changing Technologies Pte Ltd at +65 6449 3928 for assistance.

### KEEP FILTERS CLEAN!

The number one cause of poor sprayer performance is a clogged or dirty filter.

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## Troubleshooting Guide

When you encounter the problems listed below, use the suggested trouble-shooting methods. If you cannot solve the problem or have a problem with the spraygun that is not addressed in this manual, contact us.

Symptom	Possible Problem(s)	Corrective Action
Air pressure of coating appears low	<ul style="list-style-type: none"> <li>× Liquid fittings are loose</li> <li>× Air fittings are loose or damaged</li> </ul>	Inspect for loose hoses or failed air lines – Spray fittings with soapy water – tighten ones that bubble replace if necessary
	<ul style="list-style-type: none"> <li>× Dirty Trigger</li> </ul>	<ul style="list-style-type: none"> <li>× Clean the Trigger (See the <i>To Clean the Trigger</i> section of this manual)</li> </ul>
× No spray from nozzle or the spray from nozzle is erratic or spits	<ul style="list-style-type: none"> <li>× Debris in the nozzle</li> <li>× Spray is freezing due to evaporative cooling</li> <li>× Low liquid level in the container</li> <li>× Loose liquid or air fitting</li> </ul>	<ul style="list-style-type: none"> <li>× Clean nozzle according to instructions</li> <li>× Make sure that water temperature is at least 50° (10°C)</li> <li>× Refill coating container</li> <li>× Inspect hose quick connects at container, case and spraygun</li> <li>× Make sure that all liquid fittings and air fittings are properly seated</li> </ul>
	<ul style="list-style-type: none"> <li>× Dirty Trigger</li> </ul>	<ul style="list-style-type: none"> <li>× Clean the Trigger (See the <i>To Clean the Trigger</i> section of this manual)</li> </ul>
	<ul style="list-style-type: none"> <li>× Over tightened nozzle cover</li> </ul>	<ul style="list-style-type: none"> <li>× Loosen cover. It should only be finger-tight</li> </ul>
× Charging indicator (LED) blinks or goes out during operation	<ul style="list-style-type: none"> <li>× Batteries are exhausted</li> </ul>	<ul style="list-style-type: none"> <li>× Recharge batteries If problem persists, replace battery pack</li> </ul>
	<ul style="list-style-type: none"> <li>× Dirty nozzle</li> </ul>	<ul style="list-style-type: none"> <li>× Clean nozzle according to instructions</li> </ul>
× Air compressor cuts off during operation	<ul style="list-style-type: none"> <li>× Compressor has overheated</li> </ul>	<ul style="list-style-type: none"> <li>× Let unit cool for approximately 1 hour with case open</li> </ul>
× TC-320 will not start	<ul style="list-style-type: none"> <li>× No power</li> </ul>	<ul style="list-style-type: none"> <li>× Make sure the unit is plugged into an appropriate electrical receptacle</li> </ul>
	<ul style="list-style-type: none"> <li>× TC-320 is not switched on</li> <li>× Tripped power breaker</li> </ul>	<ul style="list-style-type: none"> <li>× Make sure the power switch is on</li> <li>× Turn power switch off and then on</li> </ul>

## Microbicide® TC-320 Electrostatic Sprayer Warranty

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World Changing Technologies Pte Ltd warrants to the original purchaser of a **Microbicide®** electrostatic sprayer that the equipment shall be free from defects in material and workmanship for a period of one year from date of purchase. The [Product Warranty Registration Form](#) must be returned for verification of date of purchase, model of sprayer and original purchaser.

### Disclaimer of Implied Warranties and Consequential Damages

World Changing Technologies Pte Ltd's obligation under this warranty, to the extent allowed by law, is in lieu of all warranties, implied or expressed, including implied warranties of merchantability and fitness for a particular purpose and any liability for incidental and consequential damages with respect to the sale or use of the items warranted.

Such incidental and consequential damages shall include, but not be limited to: transportation, charges other than normal freight charges, cost of installation other than cost approved by World Changing Technologies Pte Ltd, duty, taxes, charges for normal service or adjustments, any other loss of income, expenses due to loss, damage, detention or delay in the delivery of equipment or parts resulting from acts beyond the control of World Changing Technologies Pte Ltd.

### THIS WARRANTY SHALL NOT APPLY:

1. To vendor items which carry their own warranties such as, but not limited to, air compressors, flow rate valves and gauges, liquid pumps, motors and engines. World Changing Technologies Pte Ltd shall supply replacement parts at list price pending the warranty investigation of the vendor item. Vendor item parts such as air compressors, flow rate valves and gauges, hoses, liquid pumps, solenoids, and other such items must be returned before warranty credit.
2. If the electrostatic sprayer has been subject to misapplication, abuse, misuse, negligence, fire or other accident.
3. If parts not made or supplied by World Changing Technologies Pte Ltd have been used in connection of the electrostatic sprayer, if, in the sole judgment of World Changing Technologies Pte Ltd such parts affect its performance, stability or reliability.
4. If the electrostatic sprayer has been altered or repaired in a manner which, in the sole judgment of World Changing Technologies Pte Ltd such alteration or repair affects its performance, stability or reliability. This shall include but not be limited to opening of the spraygun shell by anyone not authorized by World Changing Technologies Pte Ltd to do so.
5. To normal maintenance, service and replacement items such as, but not limited to, lubricant, filters, or to normal deterioration of such things as, but not limited to, hoses and exterior finish, due to use and exposure.

NO EMPLOYEE OR REPRESENTATIVE OF WORLD CHANGING TECHNOLOGIES PTE LTD IS AUTHORIZED TO CHANGE THIS WARRANTY IN ANY WAY OR GRANT ANY OTHER WARRANTY UNLESS SUCH CHANGE IS MADE IN WRITING AND IS SIGNED BY A CORPORATE OFFICER OF WORLD CHANGING TECHNOLOGIES PTE LTD.

# Product Warranty Registration Form

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Please complete the Product Warranty Registration Form and return to World Changing Technologies Pte Ltd.

## Microbicide® Electrostatic Systems

Model Number: \_\_\_\_\_

Serial Number: \_\_\_\_\_

Purchase Date: \_\_\_\_\_

Company: \_\_\_\_\_

Contact Person: \_\_\_\_\_

Company Address: \_\_\_\_\_

Address (Line 2): \_\_\_\_\_

City: \_\_\_\_\_

State: \_\_\_\_\_

Country: \_\_\_\_\_

Postal Code: \_\_\_\_\_

Phone Number: \_\_\_\_\_

Fax Number: \_\_\_\_\_

E-mail Address: \_\_\_\_\_

Send to:  
World Changing Technologies  
Pte Ltd  
8 Burn Road  
#08-02/03 Trivex  
Singapore 369977

Tel: (65) 6449 3928  
e-mail: [service@wctinfo.com](mailto:service@wctinfo.com)

**The signed and returned  
Product Warranty  
Registration Form will  
indicate acceptance of  
system, a clear  
understanding of the  
warranty and receipt of  
operator's manual on safe  
and proper operating  
procedures of this  
electrostatic system.**

# Spraygun Return Form

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When returning a spraygun for warranty or repair services to World Changing Technologies Pte Ltd, please pack it securely and include the following form with your spraygun.

Spraygun Serial Number: \_\_\_\_\_

Returned from:

Company: \_\_\_\_\_

Contact person: \_\_\_\_\_

Phone number: \_\_\_\_\_

Shipping address:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Mailing address (If different):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date last serviced:

\_\_\_\_\_

Problems with the Spraygun (if any):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Send to:  
World Changing  
Technologies Pte Ltd  
8 Burn Road  
#08-02/03 Trivex  
Singapore 369977

Tel: (65) 6449 3928  
e-mail: [service@wctinfo.com](mailto:service@wctinfo.com)

World Changing  
Technologies Pte Ltd  
recommends sending your  
spraygun via a carrier with  
tracking if you are sending  
from outside of Singapore.

Payment for return of spraygun may be by TT, bank transfer, company check, COD or Credit Card processed through PayPal.

## Safety Decals

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Appropriate safety decals are placed on equipment in order to alert the operator to possible dangers. If any decal is missing or damaged, please contact us immediately for a replacement decal.



### PROTECT YOUR LUNGS PROTECT YOUR EYES

READ AND FOLLOW THE CHEMICAL  
MANUFACTURER'S INSTRUCTIONS  
CAREFULLY.

It is extremely important for the owner/operator's safety as well as the safety of other people in the vicinity that all chemical safety precautions are followed.

This label is placed on top of the Bio Electrostatic Applicator.

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### COMPRESSOR IS HOT!

The applicator's compressor becomes hot during normal operation.

DO NOT TOUCH.

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### KEEP FILTERS CLEAN!

This label is wrapped around the hose to remind you to clean the filters regularly. The number one cause of poor applicator performance is a clogged or dirty filter.

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