

Greenwave® Dirty Electricity Filters

Greenwave filters reduce the dirty electricity flowing along wiring in homes and other buildings.



What Is Dirty Electricity?

The term “dirty electricity” refers to erratic spikes and surges of electrical energy traveling along power lines and building wiring, where only standard AC electricity should be. Dirty electricity is ONE of four types of EMF pollution now common in homes and other settings. It is also known as electrical noise, line noise, power line EMI (electromagnetic interference), and microsurge electrical pollution.

Dirty electricity is created by modern electronics, appliances, energy-efficient lights, and other devices that run on electricity. Why? Because many of these devices no longer use standard AC electricity “as is.” Instead, they must change or “manipulate” electrical current in one way or another to operate.

For example, many electrical devices today must convert standard 50/60-Hertz AC electricity (alternating current) into other forms of electricity [such as low voltage direct current (DC) or higher frequency AC] to operate. And, many devices now draw power from wiring intermittently, in short bursts or pulses rather than continuously, by turning the flow of power to a device “on” and “off” repeatedly, sometimes thousands of times per second.

These processes interrupt the smooth flow of standard AC electricity, creating harmonics and erratic spikes of electrical energy known as voltage transients. Once created, this unusable “dirty electricity” spreads throughout a building and even to other buildings via wiring, power lines, and other means. As it travels, dirty electricity may radiate potentially harmful electromagnetic fields (EMF) into environments where people live, learn, work, play, and more.

Dirty electricity can interfere with the proper functioning of appliances and electronic equipment, and more importantly, with natural electrical processes within the human body. Exposure to dirty electricity and other types of EMF pollution has been associated with a wide variety of health problems such as cancer, diabetes, asthma, sleep disturbances, fatigue, skin rashes, tingling sensations, allergy symptoms, headaches, muscle and joint pain, brain fog, memory loss, ADHD symptoms, depression, anxiety, and more.

How Greenwave Filters Reduce Dirty Electricity

Greenwave filters utilize state-of-the-art electromagnetic interference (EMI) filtering technology to significantly reduce the harmonics and voltage transients present on the wiring in buildings. This is an effective and practical way to target this particular type of EMF pollution. The less dirty electricity there is flowing along building wires, the less that will radiate into your environment.

The filters plug directly into electrical outlets and power strips. They “short out” (shunt) erratic surges/spikes of electrical energy (i.e., dirty electricity), while allowing standard 50/60-Hertz AC electricity to pass through unimpeded.

(NOTE: Greenwave-SOLS filters are ‘passive.’ Installing them should not increase actual electrical consumption in your environment. The current is orthogonal to the voltage field (i.e. 90 degrees), therefore, current from the filters is out of phase with voltage and does not create electrical consumption.)

Key Features of Greenwave Filters

- **Easy to use!**

Simply plug the filters into electrical outlets and power strips for immediate results.

- **Built-in outlet for plug-through convenience**

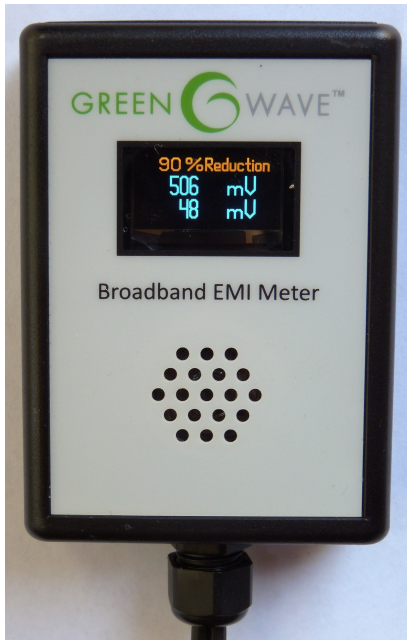
Most Greenwave filter models include a built-in outlet at their base. You can plug electronics and other devices into the filters when you need an outlet to access power.

- **Safety certified and environmentally friendly**

Greenwave filters meet rigorous safety standards (e.g., UL, CE, and/or Intertek-SEMKO) and are RoHS compliant. RoHS standards restrict the use of specific hazardous materials such as lead, mercury, cadmium, phthalates, etc. in electrical and electronic products.

Measuring the Effectiveness of Greenwave Filters

Many people want to know how effective Greenwave filters are at reducing the dirty electricity flowing along electrical wiring in their homes and other places. This is easy to measure with a plug-in dirty electricity meter, such as the *Greenwave Broadband EMI Meter* shown here.



Greenwave's meter is easy to use. Simply plug it into electrical outlets to find out how much dirty electricity is present on nearby wiring. The meter can show "BEFORE filter" and "AFTER filter" measurements on the same screen simultaneously, making comparisons easy.

The meter is also an excellent tool for guiding the installation of Greenwave filters. It can help you identify significant sources of dirty electricity in your environment and determine the best number of filters to install in each room and in which outlets for optimal results. It can also help you identify and troubleshoot problems, such as resonance, that can occasionally occur during installation.

IMPORTANT NOTE:

There are 4 different types of EMF pollution now common in homes and other settings: 1) 60 Hz AC electric fields, 2) 60 Hz AC magnetic fields, 3) radio frequency (RF) radiation, and 4) dirty electricity. Different types of EMF pollution typically require different measurements tools. Most consumer-level meters for measuring AC electric fields, AC magnetic fields, and radio frequency (RF) radiation are NOT effective instruments for measuring dirty electricity or the effectiveness of dirty electricity filters.

Getting the Most from Greenwave Filters

To achieve the full benefit of Greenwave filters, it is best to install them throughout your environment.

The number of filters needed will depend on the size of the building or space where you want to install them (e.g., # of rooms) and, more importantly, on the concentration of electronics, appliances, energy-efficient lights, and other electrical devices in each room. It will also be influenced by the amount of dirty electricity entering your environment's electrical system from outside sources (via power lines/wiring).

In **homes**, two filters are typically needed to reduce dirty electricity in an average-sized room. Rooms with heavy concentrations of electronics, appliances, energy-efficient lights, and other electrical devices often require more than two filters (e.g., 3 or 4). Small rooms, such as bathrooms, usually need only one. On average, 16 to 20 filters are typically needed to reduce dirty electricity to reasonable levels throughout an average 3- to 4-bedroom home.

Workplace settings generally require 2 to 3 filters for every 100 square feet, and more if dirty electricity levels are high.

Schools usually need 5 filters per classroom.

These estimates are for homes, workplace settings, and schools in North America and other countries with 60 Hz, 100V – 127V electricity. Less dirty electricity filters (approximately half) are typically needed in buildings within countries with 50 Hz, 220V – 240V electricity.

Please keep in mind that these are estimates and meant to provide a good starting place for thinking about the number of filters you will need. For the best accuracy, a Greenwave Broadband EMI Meter is suggested. If you would like additional help determining your filter needs, please contact us.

customerservice@greenwavefilters.com
1-800-506-6098 or 1-415-275-3485

Keep reading for information about installing Greenwave filters in homes and other buildings.

Installing Greenwave® Filters

Please read these installation instructions and the “Product Disclaimer and Customer Satisfaction Guarantee” in their entirety BEFORE installing your Greenwave filters.

STEP ONE

Check for wiring errors.

Prior to installing Greenwave filters, we recommend testing the electrical circuits in your environment for wiring errors. **To test for BASIC wiring errors, you can use a circuit (outlet/receptacle) tester to check EACH outlet prior to plugging in Greenwave filters.** These testers are inexpensive and can be purchased at most hardware stores.

(NOTE: Greenwave filter kits for the U.S. and Canada include a free outlet tester for your convenience.)

If any wiring errors are found, please contact an electrician to correct the error(s) before installing filters. Wiring errors can cause electrical hazards in homes and other settings, and can also create elevated AC magnetic fields in buildings. These magnetic fields can be amplified when any electrical devices, including Greenwave filters, are plugged into outlets that are part of circuits affected by the wiring errors.

STEP TWO

Install your filters.

For best results, we recommend using a plug-in dirty electricity meter, such as the *Greenwave Broadband EMI Meter*, to guide installation. This type of meter plugs directly into electrical outlets and measures the amount of dirty electricity present on nearby wiring. It can show how much dirty electricity Greenwave filters reduce from your wiring and help you determine the best number of filters to install in each room and the best combination of outlets to choose for installation. It can also help you identify and troubleshoot problems, such as resonance, that can occasionally occur during installation.

IMPORTANT NOTE:

There are 4 different types of EMF pollution now common in homes and other settings: 1) 60 Hz AC electric fields, 2) 60 Hz AC magnetic fields, 3) radio frequency (RF) radiation, and 4) dirty electricity. Different types of EMF pollution typically require different measurements tools. Most consumer-level meters for measuring AC electric fields, AC magnetic fields, and radio frequency (RF) radiation are NOT effective instruments for measuring dirty electricity or the effectiveness of dirty electricity filters.

If you plan to use a *Greenwave Broadband EMI Meter* to help guide filter installation, please refer to *Greenwave's Meter Instructions* before plugging filters into outlets or power strips. (These instructions will explain how to use the meter when installing filters.)

If you will NOT be using a plug-in dirty electricity meter to guide filter installation, proceed by plugging filters into electrical outlets and power strips.

For BEST results, we recommend installing filters in outlets throughout your home and/or other spaces where you spend significant time. Information on the next page provides a general estimate of the number of filters typically needed for various types of spaces.

Also provided on the remaining pages are some special tips to consider as you install filters in your environment and important information about the built-in outlet in Greenwave filters.



Special Safety Note

Greenwave's dirty electricity filters and meter may be used by children 12 years and above and persons with reduced physical, sensory, or mental capabilities as long as these individuals have been given supervision or instruction concerning the safe use of the filters/meter and clearly understand the hazards involved. Children should NOT play with the filters/meter and should NOT clean or maintain them in any way without supervision.

Approximate Number of Filters Needed

Homes:

Type of Room	Number of Greenwave Filters
Kitchen Family Room Living Room Media Room Home Office Other rooms with a high concentration of electronics, fluorescent light bulbs or tubes, light dimmer switches, and/or appliances and other devices with internal motors	3 – 4 filters (each)
Bedroom Dining Room Laundry Room	2 filters (each)
Bathroom Walk-in Closet	1 filter (each)
Basement Garage Tool Shed	1 – 2 filters for every 150 square feet

Business/Workplace Settings:

2 – 3 filters for every 100 square feet

Schools:

5 filters per classroom

Special Installation Tips

- Do NOT plug Greenwave filters into electrical outlets that are incompatible with the voltage (V) or amp (A) specifications shown on the back label of the filters. (See the table of voltage and amp specifications on the next page of these instructions for more details.)
- Install filters as close as possible to known sources of dirty electricity, *for example*: computers, printers, cordless phones, TVs, video game consoles, Wi-Fi systems, fax machines, copiers, scanners, and other electronic equipment; light dimmer switches; fluorescent and compact fluorescent lights; SMART meters; and appliances/devices with variable-speed motors such as blenders/mixers and hair dryers.

(Installing 2 filters in outlets near computers, printers, cordless phones, TVs, video game systems, and other similar electronic equipment is recommended.)

- When possible, install at least 2 filters near the main electrical panel in your home. (This is the point where electricity enters your home from neighborhood power distribution lines.) This will help reduce the amount of dirty electricity that enters your home's electrical system from outside sources (via power lines).

- To minimize exposure to electromagnetic fields (EMF), it is generally advisable to plug electronics of ALL kinds, including Greenwave filters, into outlets that are located at least 1 - 3 feet away from specific locations where people stand, sit, or recline for extended periods of time (*for example*: beds, office chairs, couches, easy chairs, etc).

All electronics emit a localized AC magnetic field when operating. The strength of the field and the distance it will extend from the electronic device will depend upon the particular device in question. Fortunately, these localized AC magnetic fields generally decrease back down to ambient levels within several inches or feet of their sources. The AC magnetic field emitted by a Greenwave filter, for example, will typically decrease to ambient levels within 6 – 12 inches of the filter.

- If possible, avoid plugging a Greenwave filter into an outlet controlled by a light switch. If the switch is turned off, the filter will be unable to do its job. If you need to plug a filter into a switch-controlled outlet, remember to leave the switch turned on.
- Plug-in dirty electricity filters are not always compatible with solar energy systems and the storage back-up units they use. Check with your solar system manufacturer before installing Greenwave filters.
- Greenwave filters and other dirty electricity filters that utilize capacitance technology should NOT be used in buildings being powered by a generator (for example during power outages). If you have a generator to provide electricity during power outages or at other times, make sure to UNPLUG your Greenwave filters while the generator is operating. You can plug them back in when power to the grid has been restored and the generator is no longer running.

Trouble Shooting Possible Installation Problems

I plugged a filter into an outlet and it started to buzz. Is there a problem?

This usually means the filter is overloaded. In other words, there is more dirty electricity on nearby wiring than the filter can reduce sufficiently on its own. This problem can usually be resolved by installing another filter in the same outlet (using an electrical tee or power strip) or an additional 1 to 2 filters in nearby outlets or power strips. If the buzzing doesn't stop after installing additional filters, contact Greenwave.

I saw a small spark and hear a popping sound as I plugged in a Greenwave filter. Is this normal?

Yes, this is normal as electrical energy “loads into” the capacitor technology used by the filters. It is not dangerous to you, your Greenwave filters, or other equipment you have plugged into outlets. Greenwave filters undergo rigorous safety testing and are safety certified.

When disconnecting a filter, it may take a few seconds for small accumulations of electrical charge to completely discharge from the filter. It is advisable to avoid touching the plug on the filter for a few moments after removing the filter from the outlet.

I plugged a filter into an outlet in my kitchen and the dirty electricity reading on my Greenwave meter went up rather than down. What should I do?

This is unusual, but does occur on occasion. First, use an outlet (receptacle) tester to check the outlet for the following basic wiring errors: open ground, open neutral, open hot, hot/ground reverse, and hot/neutral reverse. If any of these wiring errors exists, we recommend contacting an electrician to repair it. If none of these errors is present, the trouble may be resonance or a shared neutral wire between the sockets in the outlet. (NOTE: Occasionally, the two receptacles (sockets) in an outlet are fed by different circuits, but share a neutral connection. This tends to be more common in kitchens than other rooms, and is not an ideal wiring configuration. You may want to talk with an electrician about rewiring the outlet.)

When installing filters, we recommend skipping this outlet and moving to the next outlet in the room.

Plug-Through Technology (Built-In Outlet)

Greenwave filters for the United States, Canada, and some other countries include a built-in outlet at their base for plug-through convenience. When you need an outlet, most electronics and other devices can be plugged into Greenwave filters to access power to run. Keep the following in mind when using the built-in outlet in Greenwave filters:

- The built-in outlet in the filters can be used **ONLY** when the filters are plugged into outlets that are compatible with the voltage (V) and amp (A) specifications shown on the back label of the filters and **ONLY** with devices that are also compatible with these specifications. See the table of voltage and amp specifications to the right for more details.
- Some battery-charging devices are not compatible with the high capacitance technology employed by dirty electricity filters. For this reason, we recommend that you do NOT plug battery chargers, back-up power supplies, and electric devices that include built-in chargers (such as electric toothbrushes and shavers) directly into the built-in outlet of Greenwave filters or into the same wall outlet or power strip as a filter.

**Greenwave Filters
Voltage and Amp Specifications**

This table shows the voltage and amp specifications for each Greenwave filter model. The model number for your filters is shown on the back label of the filters.

Filter Model	Appropriate Voltage Range	Maximum Amps
Spectrum 2500i Broadband 1500 Broadband 1500G	AC 100V – 120V	Up to 15A

These filter models are designed for use in the U.S. and Canada, as well as other countries with Type A or Type B electrical sockets with voltage up to 120V and an amp rating of 15A or less. Do NOT plug Spectrum 2500i, Broadband 1500, or Broadband 1500G filters into electrical outlets with voltage higher than 120V or with an amp rating higher than 15A. Also, do NOT use the built-in outlet in these filters with devices that will draw more than 15A of electrical current. *

Filter Model	Appropriate Voltage Range	Maximum Amps
Spectrum 2500-EF	AC 220V – 240V	Up to 16A (@ 40C)

Spectrum 2500-EF filters are designed for use in European countries and other areas around the world with Type E or Type F electrical sockets. Do NOT plug Spectrum 2500-EF filters into electrical outlets with voltage outside the 220V – 240V range or an amp rating higher than 16A. Also, do NOT use the built-in outlet in these filters with devices that will draw more than 16A of electrical current. *

Filter Model	Appropriate Voltage Range	Maximum Amps
Spectrum 2500-J	AC 220 V – 240V	Up to 10A (@ 40C)

Spectrum 2500-J filters are designed for use in Switzerland and other countries with Type J electrical sockets. Do NOT plug Spectrum 2500-J filters into electrical outlets with voltage outside the AC 220 – 240V range or an amp rating higher than 10A. Also, do NOT use the built-in outlet in these filters with devices that will draw more than 10A of electrical current. *

Filter Model	Appropriate Voltage Range	Maximum Amps
Spectrum 2400G	AC 100V – 240V	Up to 15A

Spectrum 2400G filters do NOT have a built-in outlet at their base. They can be used in electrical outlets with voltage anywhere from 100V up to 240V. They come with a Type B plug, but can be used with high-quality plug adapters designed for 24/7 use.

* The maximum amount of electrical current (i.e., amps) that a device will draw from an outlet is typically listed on the label of the device.

If you have any questions about installing or using your Greenwave filters, please contact us via e-mail or phone at customerservice@greenwavefilters.com, 1-800-506-6098, or 1-415-275-3485.

Greenwave® Filter Disclaimer and Customer Satisfaction Guarantee

Our goal at Greenwave International is to reduce the overall level of dirty electricity (a.k.a. electrical noise, line noise, power line EMI, microsurge electrical pollution) on the wiring in buildings where people spend significant amounts of time (e.g., homes, schools, businesses). Greenwave filters target erratic electrical energy (i.e., harmonics and voltage transients) on building wiring, which is one potential source of RF radiation in buildings. They do NOT eliminate the extremely low frequency (AC 50/60Hz) electric and magnetic fields emitted from wiring, cords, and electrical devices, and do NOT filter ambient ELF, RF, or microwave frequencies directly from the air. While some scientists have shown improvements in health when dirty electricity is reduced in buildings and many individuals have reported such benefits anecdotally, Greenwave cannot guarantee health improvements from the installation of Greenwave filters.

It is important to test the electrical circuitry of a building for wiring errors before installing any sort of electronics and other electrical devices, including Greenwave filters. We advise that you check for wiring errors and correct any problems identified before installing these filters. Wiring errors can cause electrical hazards in homes and other settings, and can also create elevated AC magnetic fields in buildings. These magnetic fields can be amplified when any electrical devices, including Greenwave filters, are plugged into outlets affected by the wiring errors.

We also recommend that you plug electronics and other devices (including Greenwave filters) into outlets or power strips that are at least 1 - 3 feet from beds, desks and chairs, and other places where you or others are stationary for extended periods of time.

Do NOT plug Greenwave filters into electrical outlets that are incompatible with the AC voltage (V) or amp (A) specifications shown on the back of the filters. Doing so may damage the filters and will void the filter warranty and 60-day money-back guarantee. If your electrical system uses direct current (DC) rather than alternating current (AC), please contact Greenwave before purchasing or installing filters.

Greenwave filters deploy capacitance technology to "short out" (shunt) dirty electricity traveling along the wiring in buildings. Some battery-charging devices are not designed to work with high capacitance technologies. Therefore, battery chargers, back-up power supplies, and electric devices that include built-in chargers (such as electric toothbrushes and shavers) should not be plugged into the same wall outlets or power strips as Greenwave filters. Similarly, these items should not be plugged directly into Greenwave filters that include an outlet at their base. In addition, Greenwave filters are not always compatible with solar energy systems and the storage back-up units they use. You should always check with your solar system manufacturer before buying and installing Greenwave filters.

Greenwave filters and other dirty electricity filters that utilize capacitance technology should NOT be used in buildings being powered by a generator (for example during power outages). If you have a generator to provide electricity during power outages or at other times, make sure to UNPLUG your Greenwave filters while the generator is operating. You can plug them back in when power to the grid has been restored and the generator is no longer running.

For Greenwave filters that include a built-in outlet at their base:

The built-in outlet in Greenwave filters can be used ONLY when the filters are plugged into outlets that are compatible with the voltage (V) and amp (A) specifications shown on the back label of the filters and ONLY with electrical devices that are also compatible with these specifications. (See table of voltage and amp specifications provided earlier in this document for details.) Also, as mentioned above, do NOT plug battery chargers, back-up power supplies, or electric devices that include built-in chargers (such as electric toothbrushes and razors) into the outlet at the base of a Greenwave filter. Doing any of the above may damage the filters and will void the filter warranty and 60-day money-back guarantee. Additionally, some battery back-up systems and electric devices that include built-in batteries will not charge properly or fully when they are plugged into or near a Greenwave filter.

Greenwave, and any of its global distributors, are not responsible for inappropriate use of Greenwave-SOLS filters and meters, when used outside of directions and parameters provided with the product installation and use guidelines.

If you are not completely satisfied with Greenwave filters, you may return them to Greenwave International within 60 days of purchase for a refund or credit. A 5% restocking fee may be imposed on returns, unless the return is due to a manufacturer defect in the product or a shipping error.

Disposal Guidelines

Greenwave filters include electronic components, and therefore, should NOT be thrown away as part of your unsorted municipal waste (i.e., regular trash).



Instead, the filters should be taken to a location that can handle the proper treatment, recycling, or environmentally sound disposal of electronic/electrical equipment. (For example, in many European countries, you can take old electronics and other electrical equipment to a local WEEE collection point.) If you are not sure where to take your old filters, please contact Greenwave for help.

By disposing of your old Greenwave filters properly, you are helping to protect the environment, human health, and raw material supplies, and to maintain sustainable development.

(NOTE: The estimated lifespan of Greenwave filters (i.e., the mean time before failure) is approximately 200,000 hours, which is ~ 22.8 years.)

Greenwave® Filters INSTALLATION SUMMARY

General Instructions

- Before installing filters, we recommend testing all outlets for wiring errors. Repair wiring errors before installing filters.
- If NO wiring errors are found, proceed by plugging filters into outlets.

Installation Tips

- Do NOT plug Greenwave filters into electrical outlets that are incompatible with the voltage (V) or amp (A) specifications shown on the back label of the filters. (See the table of voltage and amp specifications provided in the full instruction packet for more details.)
- Install filters as close as possible to known sources of dirty electricity. Installing 2 filters in outlets near computers, printers, cordless phones, TVs, video game systems, and other similar electronic equipment is recommended.
- Install at least 2 filters near the main electrical panel in your home.
- Whenever possible plug Greenwave filters (and other electrical devices) into outlets that are at least 1 - 3 feet from locations where people stand, sit, or recline for extended periods of time.
- If you want or need to plug a Greenwave filter into a switch-controlled outlet, leave the switch turned on so the filter can operate.
- Check with your solar system manufacturer before installing Greenwave filters. (Plug-in dirty electricity filters are not always compatible with solar energy systems and the storage back-up units they use.)
- Greenwave filters and other dirty electricity filters that utilize capacitance technology should NOT be used in buildings being powered by a generator (for example during power outages). If you have a generator to provide electricity during power outages or at other times, make sure to UNPLUG your Greenwave filters while the generator is operating. You can plug them back in when power to the grid has been restored and the generator is no longer running.

Using the Built-In Outlet

- Only use the built-in outlet in Greenwave filters when the filters are plugged into outlets that are compatible with the voltage (V) and amp (A) specifications shown on the back label of the filters and ONLY with electrical devices that are also compatible with these specifications. (See the table of voltage and amp specifications provided in the full instruction packet for more details.)
- Do NOT plug battery chargers, back-up power supplies, and electric devices that include built-in chargers (such as electric toothbrushes and shavers) into the built-in outlet of Greenwave filters or into the same wall outlet or power strip as Greenwave filters. (Some battery-charging devices are not compatible with the high capacitance technology employed by dirty electricity filters.)

Refer to Greenwave's full instruction packet for additional details about installing Greenwave filters and troubleshooting possible problems.

Greenwave® International RETURN POLICY

If you are not completely satisfied with **Greenwave Filters**, you may return them to Greenwave International within 60 days of purchase for a refund or credit. The **Greenwave Broadband EMI Meter** may be returned due to manufacturer defects.

Restocking Charge:

A 5% restocking fee may be imposed on all returns, unless the return is due to a manufacturer defect in the product(s) or a shipping error.

Return Shipping Charges:

The customer is responsible for return shipping charges, unless the return is due to a manufacturer defect in the product(s) or a shipping error.

Return Shipping Requirements:

- An original invoice/receipt must accompany all returns.
- Return products MUST be wrapped/protected in bubblewrap and sturdy packaging similar to that in which they were received.
- **Returns will be accepted only if they are undamaged and in saleable condition, unless the return is due to a manufacturer defect in the product(s).**
- Return shipments MUST be able to be tracked. Contact Greenwave International with a tracking number for your return shipment.

**customerservice@greenwavefilters.com
1-800-506-6098 or 1-415-275-3485**

Returns Due To Product Defects or Shipping Errors:

For defective products or shipping errors, contact our customer service department for replacements or to arrange for a refund. In these cases, Greenwave International will cover return shipping charges.

Special Safety Note

Greenwave's dirty electricity filters and meter may be used by children 12 years and above and persons with reduced physical, sensory, or mental capabilities as long as these individuals have been given supervision or instruction concerning the safe use of the filters/meter and clearly understand the hazards involved. Children should NOT play with the filters/meter and should NOT clean or maintain them in any way without supervision.