Fence Energizer FAQs

Q. What is a fence energizer?

A. A box that takes in electrical energy from an outside source (either a battery or a 110 volt outlet).

The energizer then pushes the energy out through the fence (*positive*) terminal in very brief, high voltage, high amperage pulses. The ground (*negative*) terminal's purpose is to absorb any excess pulse energy back into the energizer.

Q. What is an electric fence?

A. An extension of the 2 terminals (fence and ground/earth) of the energizer.

The earth/negative terminal is extended by driving metal rods into the soil and connecting them to the terminal with conductive wire.

The outbound/positive/fence terminal is extended by attaching conductive wires to it. They are suspended above the soil and kept separate from the soil by insulators or nonconductive posts.

Q. How high is the voltage of a pulse?

A. Up to 14,000 volts. That sounds extreme—but static electricity is often as much as 25,000 volts.

Q. How brief is the electric pulse?

A. Less than 3/10,000 of a second.

Q. Will I feel anything if I touch a terminal when the energizer is on?

A. Yes and no. You will feel nothing if you touch only the ground terminal.

But if you accidentally touch both at the same time (we strongly advise against this!) you will feel the full impact of the pulse.

We never contact the terminals (on or off) without first touching both terminals with insulated metal wire (to displace the charge)!

Q. What happens when grass touches an energized fence wire?

A. The fence wire is "pressurized" with excess electrons from the pulse.

Green vegetation is a conductor—particularly when wet. When it contacts an energized wire, the pressurized energy (measured in volts) is pushed down through the moisture in the stem to the soil. Folks call this a "leak" (similar to a hole in a water hose) or a "short."

Q. What happens when an animal touches energized wires?

A. The high voltage of the pulse pushes electrons through the animal's point of contact (often the nose or ears), then through the body's tissue and fluids and out through the feet/hooves/paws into the soil moisture.

Q. Why is animal weight a factor?

A. The weight of a heavy animal compresses the soil. This reduces electrical resistance of the topsoil and increases the joules of energy that can flow through the animal.

This explains why heavy animals are more affected by electric fence and light animals less so.

Weight (or the lack of it) explains why calves, lambs or goat kids seem to be less affected by a pulse than adult cattle, sheep, goats or horses.

Q. Why is grass color a factor in choosing a suitable energizer?

A. Green grass indicates the soil is moist, so the soil will have less resistance to a pulse.

Brown grass indicates the opposite.

Q. Which species are most affected by an electric fence pulse?

A. In order from most to least affected: pigs, horses, cattle, canines (wet noses, bare pads), raccoons, sheep, goats, deer, geese, chickens and rabbits.

This assumes adult animals are contacting the fence with their nose, beak or paw.

Q. I'm confused by all the energizers that Premier offers. Why so many?

A. Some users have strong preferences based on prior experience.

Q. Why is Premier's energizer know-how so unique?

A. Other firms may supply more units—but no one supplies more units (50,000) direct to end-users ***and*** tracks the results.

We know what failed, when and why. Often the energizer is not the problem.

When you join our community of satisfied customers, you tap into that experience and expertise.

2-Year Energizer Warranty

When you buy an energizer from Premier, you purchase more than an energizer.

You obtain these benefits:

1. If an energizer fails within 2 years of its date of purchase, we will replace the failed module or unit at our cost.

Your credit card will be charged for the replacement but you will receive full credit when the failed item is back at Premier. Your only cost is shipping the failed item to us. If the original energizer is over 2 years old, we will repair it, but you pay for the repair cost and freight.

Note: Policy does not apply to failure due to abuse or neglect.

Warranty does not cover batteries.

2. Free next-day air shipment of warranty replacement energizers.

If you think your energizer has failed, call us at 1-800-282-6631. We'll help you test your energizer to ensure that it has truly failed. This is important as we've found that 25% of the units returned to us work fine; the fence was at fault, not the energizer.

3. Free technical support.

We provide free advice before you purchase an energizer and free support afterwards for as long as you wish. All you have to do is call.

4. Solar energizer packages.

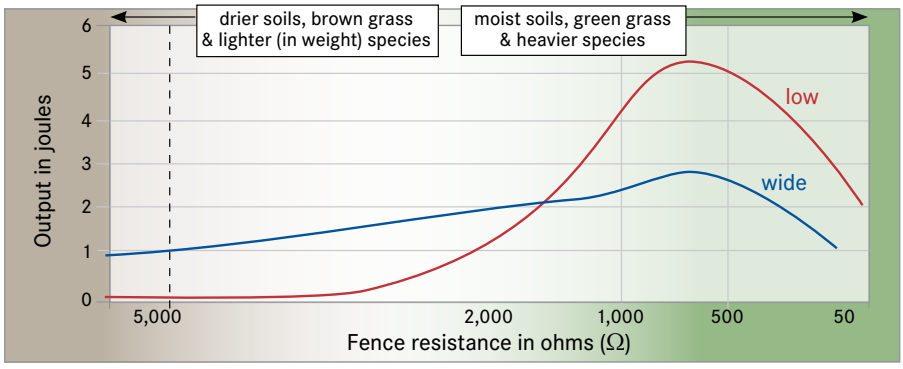
With larger energizers (over 1 joule), the panel, battery and energizer need to be correctly sized for each situation. Call us and talk to our consultants.

5. Three-year assurance against energizer obsolescence.

Premier's "contract" with customers includes repair or replacement of any nonworking units for up to 3 years.

During the 2-year warranty period, Premier pays for the replacement cost.

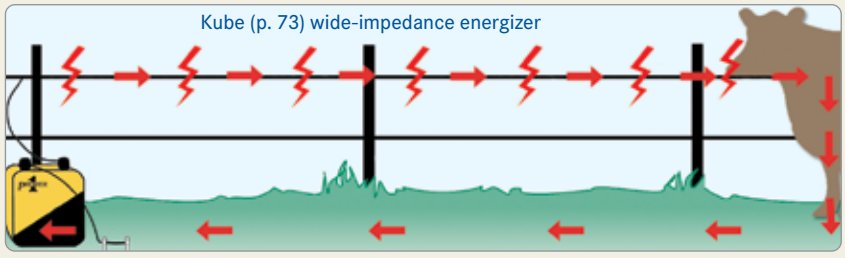
Energizer Impedance—wide vs low?



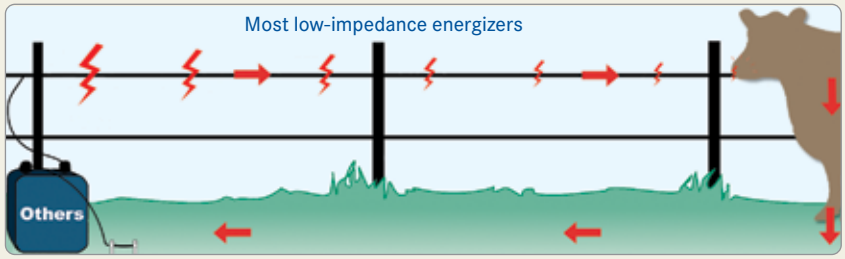
Wide vs low impedance output curves *(chart above)*

1. **An energizer's output is not a constant!** The stated number on the outside of the box is an optimum peak. It's never more than stated—and almost always much less.
2. **The curve shape is important.** The chart above shows 2 energizer output curves in joules. One is a wide-impedance unit with 2.7 joule peak output. The other is a low-impedance unit with 5.2 joules peak output.
3. **Low-impedance units excel when** the soil is moist, the grass is green, the animal is a good conductor and there are plenty of ground rods.
4. **Wide-impedance units excel when the total resistance is higher—**due to brown grass, dry soil, the animal is not a good conductor, or the total ground rod is less.
5. **The higher an energizer's peak joule output is at 500Ω,** the more likely it will be effective when there is high green-weed contact on the wires close to the ground.
6. **The higher an energizer's output in joules at 5000Ω,** the more likely it is to be effective when the soil becomes dry.

Why animals respect wide-impedance energizers!



Wide-impedance energizers *are able to deliver high-pulse energy levels and high voltages through a wider range of fence situations—including those with high total fence circuit resistance due to inferior polywire/netting; dry, sandy, rocky soils; dry, brown grass; and fewer ground rods. Animals have greater respect for and fear of such fences when energized by wide-impedance units.*



Low-impedance energizers *deliver high pain potentials when the resistance is low (hence they work well when the soil is moist and the grass is green), but less as the combined resistance of the soil, animal and wire rises. Illustrates how the joules of pulse energy at the end of the fence (and the potential pain available to animals) drop as the resistance of the fence circuit increases—due to dry soils, reliance upon stainless steel polywire and tape fences, or fencing across sandy/rocky soils.*

High vs Low vs Wide impedance energizers

Impedance is similar to resistance.

For energizers it means the level of ohms (resistance) that matches an energizer's peak output. If low ohms then it's a low-impedance energizer, etc.

The first fence chargers (50 years ago) were high-impedance units.

Their maximum output (never very much) occurred when the fence was weed-free. They could cope with drier soils but *their effectiveness disappeared when a few green weeds touched the fence.*

Most were too small in energy output/pulse strength to be effective against difficult-to-contain animals (sheep, goats, chickens).

The next generation was low-impedance energizers.

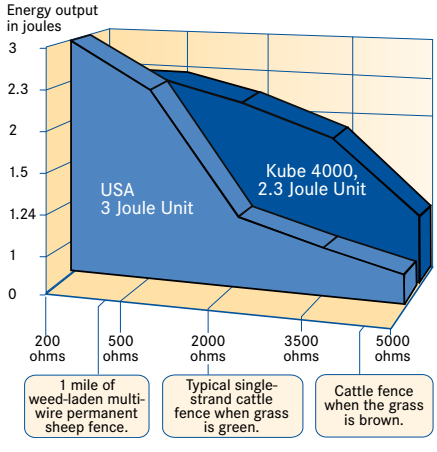
They coped well with high weed contact but not with dry soils or poor fence conductors.

They are very effective against low-resistance animals (cattle, horses, pigs) standing on moist soils.

Wide-impedance **is Premier's term for energizers that perform well in** ***both*** **dry and wet situations.**

In dry soils or with animals of high resistance (goats, wildlife and poultry), wide-impedance units outperform low-impedance units of similar output.

Graph comparing low-impedance units with a wide-impedance



Solar Energizer Systems

Why your location is important when choosing solar energizers

Q. Region, season and angle of the panel appear to be critical factors in solar energizer success. Why?

A. The maps *(below)* depict the differing hours of solar insolation for a region in winter and summer. Solar insolation is the hours of sun available per average day that have sufficient intensity to enable a solar panel to charge a battery. Three important things to note:

1. Summer insolation hours *(below)* for all areas are much higher than winter hours. For southeast Iowa it's 5.5 hours in summer and less than 3 hours in winter.
2. The hours available are very different depending on where you live. In summer Michigan has 5 hours vs 7.5 hours in Arizona!
3. Ideally the solar panel should be angled to meet the sun. That means nearly flat in summer and nearly vertical in winter—and always facing south.

Q. So why is the identical energizer sold in Michigan and Arizona?

A. It suits suppliers to keep things simple.

Yes, the panel and battery are probably too small for Michigan (except in mid-summer) and too large for Arizona (except mid-winter). That's why many farmstore solar energizers often fail.

And it's the extra sunlight in the Southwest that may damage the battery in summer by overcharging it. (Premier's solar units are fitted with a regulator to prevent this.)

Q. What powers a solar energizer at night and on days that are cloudy/rainy/snowy?

A. DC battery. All solar units have one inside the case. The battery must be large enough to supply the energizer for several sunless days in a row. (We size ours for no less than 4 sunless days.)

Q. 21 sunless days from a 5 ampere-hr battery and a 5 watt panel?

A. That's what a Premier competitor claims for their 0.5 joule energizer.

For the same size unit, Premier offers a 12 amp-hr battery, 10 watt panel and suggests only 4 days.

Explanation?

A normal 0.5 joule energizer consumes 50 milliamperes hr. So 21 sunless days extracts 25 amperes from a battery.

The misleading unit with 1/5 the battery and half the panel size reduces pulse energy as the battery voltage declines. In a day without sun the pulse is only 0.25 joules, then 0.10, then 0.05, etc. That's not a pulse that will protect your animals.

Summer vs Winter Sunlight

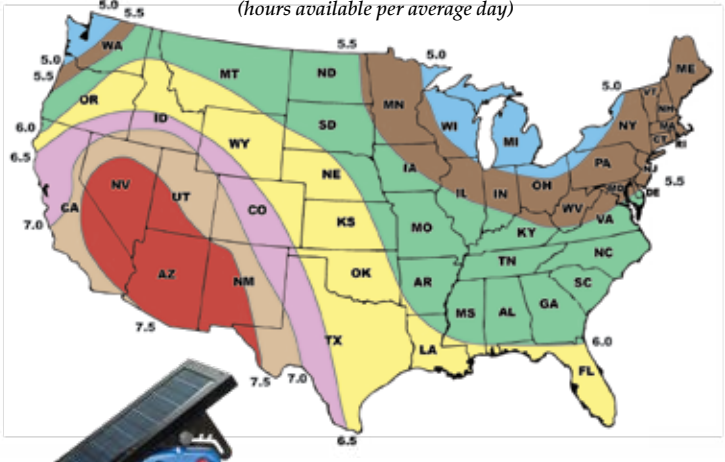
The maps below indicate the hours of summer and winter sunlight available per average day that have sufficient intensity to enable a 12v solar panel to recharge a 12v battery (defined as the hours of solar insolation).

Why is this important?

- Because a solar energizer with the right panel and battery size for New England may overcharge a battery in Arizona, unless it's equipped with a voltage regulator. Premier's solar energizers come installed with such a regulator.
- Solar panels that are right for Arizona are too small for Vermont—thus reducing battery life by undercharging.
- A solar panel sized for summer usage may be too small for winter. Putting it simply, the same solar unit cannot fit all situations. That's why solar farmstore energizers disappoint users so often.

Summer Sunlight

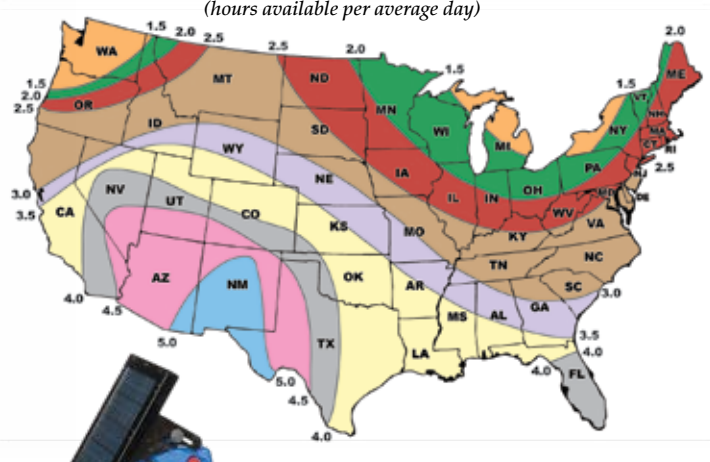
(hours available per average day)



A solar panel should be oriented due south, and almost parallel to the ground in summer months.

Winter Sunlight

(hours available per average day)



In winter months, the panel will be close to vertical—to better catch the sun low in the horizon.

Solar Energizer FAQs

Solar energizer best practices

- When not in use, turn off the unit and face panel toward the sun to recharge its battery. If in use, leave the energizer turned on and face its panel *(see diagram below)* toward the sun.
- If an energizer tests less than 2000v across the energizer terminals *(while disconnected from the fence/ground)*, test the battery with a battery meter to make sure it is fully charged. Fence voltage testers can't be used to test batteries (regrettably).
- Check batteries to make sure there is no corrosion on the terminals.
- Reduce risk of rodents chewing on wiring harnesses by keeping it above the ground.
- Do not allow animals access to the energizer.

Q. How do solar energizers compare to other fence energizers?

A.
- Their output is identical—a brief high voltage pulse of energy.
- Their input source is a DC battery.
- When the sun shines, the solar panel recharges the battery—which eliminates the hassle of carrying the battery to/from a recharger.
- They're larger in physical size than 110 volt energizers—because of the solar panel, battery and case.
- They are more expensive per unit of output—again because of battery, solar panel and larger case.

Q. How do solar energizers differ from one another?

A.
- Input needs (in milliamperes per hr).
- Pulse energy output (joules).
- Pulse rate per minute.
- Size of battery.
- Size of solar panel (in watts and volts) per milliampere of draw.
- Number of days the battery will last on its own without sunlight.
- Cost/joule of output and durability.

Q. What are the negatives of solar?

A.
- Expensive per joule of output.
- Usually have less frequent pulses—which reduces its ability to stop animals and their predators.
- More maintenance including:
  1. Keeping panel free of dust, debris, snow and ice.
  2. Keeping panel fully exposed to the sun—unshaded by trees, grass, fence posts or buildings.
  3. During winter the capability of the battery is lower—just when available sunlight to recharge batteries is also low.

Q. Are solar energizers less $$?

A. No. Plug-in units are less $$ because they do not require batteries or a solar panel.

Q. Are they less costly to operate?

A. No. The cheapest energizer to operate plugs into 110-volt AC current.

Surprised? A Kube 4000 provides 10 times more pulse energy than most farmstore solar units. Yet it uses less than 70 watts/day. That's $2.50 per year!

By comparison the battery in a typical farmstore solar fence energizer costs $24 and may need replacing every 2 years—an annual operating cost of $12.

Q. So how do Premier solar energizers differ from farmstore energizers?

A. In summary:
1. Premier's solar energizers have much higher pulse output, 0.25 to 2.0 joules.
2. We also offer "extreme" versions of PRS units for areas with less sunlight and/or colder temperatures.
3. We use larger solar panels and larger batteries per unit of output.
4. Our units cost less per joule of output.

Correct placement of energizer and solar panel is critical to the best operation of the unit!

1. Position the energizer so that the solar panel faces due south.
2. Correct tilt angle for solar panel is dependent on sun's position above the horizon. Use diagram below to determine the proper angle needed to maximize solar collection—which depends on season and location.

Note: Due to lack of sunlight in the northern USA during winter, recharge batteries externally to properly power the energizer.

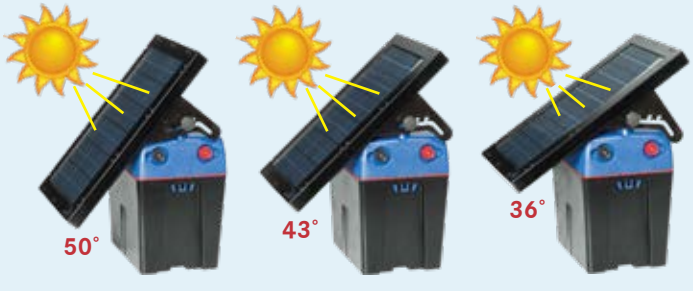
Suggested Panel Angle

Northern USA

Winter Nov – Feb | **Spring** Mar & Apr | **Fall** Sep & Oct | **Summer** May – Aug

Suggested Panel Angle

Southern USA



Winter Nov – Feb | **Spring** Mar & Apr | **Fall** Sep & Oct | **Summer** May – Aug

Energizer Systems

To Reduce Risk & Liability

Are electric fences a serious safety risk to humans?

Because touching an electric fence is painful and the voltages are high, most assume that the risks from an energized fence must also be high.

That's a myth. Consider that millions of people throughout the world are "exposed" to millions of miles of electric fences every day—***yet there is less than one death or serious injury per year worldwide—and the fence is often not the cause.***

Compare that to the number of annual injuries and deaths that occur from exposure to tractors, skid loaders, PTO shafts, balers, mowers, combines, bulls, stallions, etc.

This is not to suggest that there is no risk at all. There is, indeed, a small level of risk.

And with risk, there is also liability.

To reduce the risk…

1. Be especially careful not to touch an energized wire with the head or spine. For reasons not fully understood, this contact point is worse than contact with hands, arms, feet or legs.
2. Never approach a fence without footwear. Also, wear footwear that ***fully encloses the foot*** (not sandals). Why? Most footwear are poor conductors. So they reduce (by absorbing it) the energy that will pass through your body if you touch a fence with your hands or head.
3. Never energize barbed wire. Animals and humans can become entangled and repeatedly shocked—and thus die.
4. Hang warning signs in all areas and on fences where children and adults may encounter electrified fencing.
5. Use smaller energizers on fences located near children and untrained adults. (Most experts agree that smaller energizers are safer than large ones as long as animal control isn't put at risk.)
6. Make the fence as visible as possible to both humans and animals. Use conductors and posts that can be seen both day and night, and against all backgrounds. That's why Premier has long advised the use of white/black conductors—to provide contrast and visibility. Fence suppliers worldwide are now following our lead.
7. If possible, do not energize wires lower than 12". This allows humans who might contact a wire enough space to fall away from energized wires.
8. Build fences so all energized wires are on the ***inside*** of your boundary fence (less likely to be touched, and anyone who touches them without your permission is trespassing). We achieve this with internal energized offset wires.
9. Never connect 2 energizers to the same fence. (It doubles the pulse frequency).
10. The shock from electric fences can panic animals (e.g. horses) and cause them to crash into fences (or people) resulting in injury to one or both. To reduce this risk:
    a. Do not install electrified wires on feedlot fences, corral fences or around riding arenas.
    b. Reduce the available volts and joules on fences that enclose very small areas (e.g. night pens) to lessen the likelihood of animal stress and possible panic.

What **NOT** to do!

- Never place your head or upper spine near an electrified wire. Accidental head or neck contact can occur when pushing a voltage probe into the soil. Be careful when doing so to avoid head-to-wire contact!
- Never attempt to step over or climb through an energized fence of any kind. Never encourage anyone to touch an electric fence.

What **TO** do!

- Instruct all visitors and children to never touch electric fence.

Warning: *In 1991 an accidental fatality occurred when a young child's head contacted an electrified fence while the child was crawling on wet grass. The fence was correctly installed and functioning properly. The energizer was a UL approved unit. As a result, Premier strongly advises against allowing toddlers access to any electrified fences. Also, due to this incident and others, experts now suggest that human contact by an energized wire to the head and neck may be the most dangerous point of contact. We urge all to especially avoid this kind of contact.*

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Key Definitions

Volts/voltage: A measure of the pressure upon electrons to move from "A" to "B". Very similar to psi in water and air systems.

Electrons can't flow from A to B unless enough voltage (pressure) exists to overcome the sum of the resistance between the 2 points.

Joule(s): A measure of the volume of electrical energy (electrons) in a pulse. Comparable to pints, quarts or gallons in water systems.

When enough electrons (joules) suddenly pass through an animal's (or human's) nervous system, the pain is memorable and cause for avoidance in the future.

Amps/ampere/amperage: Measure of the rate of flow of electrons per unit of time. Similar to gallons per minute for water systems.

Pulse frequency: The number of pulses that occur each minute; 40 pulses/minute equals a pulse every 1.5 seconds.

Ohms (Ω): Measure of resistance to electrical flow. More Ω = more resistance. It's additive. If 1000 ft of wire is 200Ω then 2000 ft is 400Ω.

Conductor: Any material with low ohms/1000 ft numbers such as copper, aluminum, tin or steel.

Water is a conductor. Wood, if wet internally (e.g. sap) or externally (dew, rain), can become a conductor. Similarly moist soil and grass stems are conductors. Animal tissue with moisture in or on it is a conductor.

Electroplastic conductors/netting: A cable or ribbon comprised of small conductive metal (copper and/or steel) filaments and nonconductive plastic filaments. The metal carries the electrons. The plastic provides visibility, strength and elasticity.

Insulators: Materials with high resistance (ohm numbers) such as fiberglass and plastic.

Wood is an insulator—if it is dry internally and externally.

Dry animal hair, wool and hooves are poor conductors and thus are insulators (albeit often poor ones).

Common user mistakes with solar fence energizers *(please read!)*

1. Not facing it toward the sun. This reduces the sun exposure needed to charge the battery. Best practice is to face the unit's panel due south.

2. Not elevating it above the grass or snow *(above)*. A solar panel covered with snow will not work.

3. Allowing dust to cover the panel. A light film is not a problem—but if the unit is in a dusty location it will accumulate a layer of dust thick enough to reduce the abilities of the solar cells. A flat battery will result.

Rain, of course, washes it off.

4. Not turning off the energizer when it's not in use. A common mistake because the insulated clips connecting it to the fence and ground rod allow users to remove them without turning off the energizer.

5. Allowing the battery to gradually discharge when not in use. When storing, disconnect battery (fully charged) from the energizer. Store both in a heated area. Ensure battery charge stays above 40%.

6. Allowing posts, grass *(above)* or trees to shade it for a portion of the day. If a solar panel is ***not fully exposed to the sunlight all day, it won't develop enough voltage to recharge the battery.***

It's easy to forget that grass can rapidly grow enough to shade a unit sitting on the ground.

Fire Risk! Avoid "Continuous Current" Energizers for Electric Fence

In 2016 a fire that burned grass, trees, and a UTV was only 30 ft from a barn when emergency services arrived.

The fire occurred because the property owner used netting with a "continuous current" fence energizer.

Was electrified netting the cause of the fire?

No, netting did not cause the fire. A poorly chosen (continuous current) energizer caused the fire.

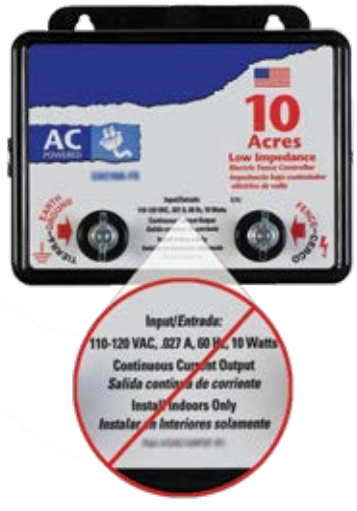
Would it have mattered if the fence wasn't netting?

No. A fire can (but not always) occur if and when a continuous current energizer is connected to any conductor (netting, rope, tape, twine, wire) that is in contact with combustible material (brown grass, leaves, straw).

The lowest electrified strand (conductor) of the netting was in contact with combustible vegetation. The "continuous current" from this particular energizer combined with the vegetation to ignite a serious fire.

So it was the energizer that caused the fire?

Yes. What enabled this unit to cause the fire was that it, as indicated by the label, is a continuous current fence energizer.



What is a continuous current fence energizer *(see above)*?

It's a very old design that is also very cheap to manufacture—thus attractive in price to buyers who are uninformed.

Unlike the great majority of energizers sold today, it does not release an intermittent pulse. Instead, it charges the wire continuously, as the label indicates, to no more than 1200 volts.

When a conductor attached to the energizer finds a conductive path to the soil (via grass, stray piece of wire), a continuous flow of electricity travels down this path to the soil. This creates a buzzing sound.

If the right conditions are present, it does not take long for the buzz to create enough heat to ignite the combustible material.

How do pulsed units work?

Most modern fence energizers send a very brief (less than 3/10,000 of a second), high voltage (2000-6000 volts) pulse down the conductor every 1-2 seconds.

Though powerful enough to deter animals, a pulse this brief and infrequent rarely poses a fire risk when the conductor is near combustible material. There simply isn't enough time for heat to build and allow ignition to occur.

The label calls this a "low impedance" energizer. Aren't they safe?

Until now that was true. This is the first time that we've seen "low impedance" on the same energizer label as "continuous current." Unfortunately, this encourages folks to buy an energizer that will damage netting and is a potential fire risk.

How do I make the right choice?

If you have questions, contact Premier directly by phone or email. Our experts have years of experience and can help.