

# USER MANUAL

PVSTOP FOR

FIRST RESPONDERS  
ELECTRICAL TECHNICIANS  
PV SYSTEM OWNERS  
PV SYSTEM OPERATORS



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# MAKING SOLAR ENERGY SAFE.



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The contents of this document are intended as a general guide only. The contents of it must be considered in context of all relevant health and safety laws. Where there is any doubt about any requirement or recommendation or any potential safety issue PVStop International Pty Limited should be consulted in relation to the taking of any actions referred to in this document before those actions are taken.

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# TABLE OF CONTENTS



<b>01</b>	<b>RENEWABLE ENERGY OVERVIEW &amp; RISK FACTORS</b>	<b>PAGE 03</b>
<b>02</b>	<b>ABOUT PVSTOP</b>	<b>PAGE 09</b>
<b>03</b>	<b>WARNINGS AND SAFETY INSTRUCTIONS</b>	<b>PAGE 11</b>
<b>04</b>	<b>SITUATIONAL AWARENESS</b>	<b>PAGE 12</b>
<b>05</b>	<b>OPERATION</b>	<b>PAGE 13</b>
	BEFORE APPLYING PVSTOP	PAGE 14
	PVSTOP APPLICATION	PAGE 16
	PVSTOP POST-APPLICATION INSTRUCTIONS	PAGE 20
<b>06</b>	<b>MAINTENANCE</b>	<b>PAGE 22</b>
<b>07</b>	<b>STORAGE AND PLACEMENT</b>	<b>PAGE 23</b>
<b>08</b>	<b>POISONS INFORMATION</b>	<b>PAGE 23</b>
<b>09</b>	<b>APPENDIX</b>	<b>PAGE 24</b>
	APPENDIX 1: SERVICE INSTRUCTIONS	PAGE 24
	APPENDIX 2: PRODUCT INFORMATION SHEET	PAGE 25

# 01 RENEWABLE ENERGY OVERVIEW AND RISK FACTORS

The world is in the midst of a clean energy revolution driven largely by rising grid electricity prices, government incentive schemes and a positive public sentiment towards protecting the future of our planet.

The increasing uptake of solar panels and the downward pressure on solar PV system pricing has led to an unprecedented level of growth in the global solar PV system market, growth that is forecast to increase exponentially in the decades ahead.

In line with the exponential growth of the solar industry, there has been a similar growth in the number of fire and emergency related incidents involving solar PV systems which has highlighted a number of unanticipated safety risks.

## UNDERSTANDING THE PROBLEM

Solar panels cannot be easily “switched off”. As long as they are exposed to light, the solar panels and the wiring leading down from the panels are continually producing potentially lethal amounts of DC electricity, in professional terms this is known as the DC Danger Zone and up until now there has been no safe or practical way to “switch off” these solar PV systems at the source (the solar panel).

***The ONLY way to de-energise or “switch off” solar panels at the source of production (the solar panel) is to block the light – light is the source of power***

## PVSTOP IS THE SOLUTION

PVSTOP is the only product that quickly and safely isolates the power produced by solar PV systems at the source, the solar panels themselves. PVSTOP coats solar panels like a “liquid tarpaulin”, blocking the light and “switching off” the solar panels in seconds, rendering the solar PV system electrically safe.

## DO SOLAR PANELS PRODUCE ENOUGH POWER TO BE DANGEROUS?

Just a little current can kill. A typical residential solar PV array can produce 6 – 8 amps at up to 600 volts. As the graph below demonstrates as little as 500 milliamps (0.5 amps) is enough to kill.

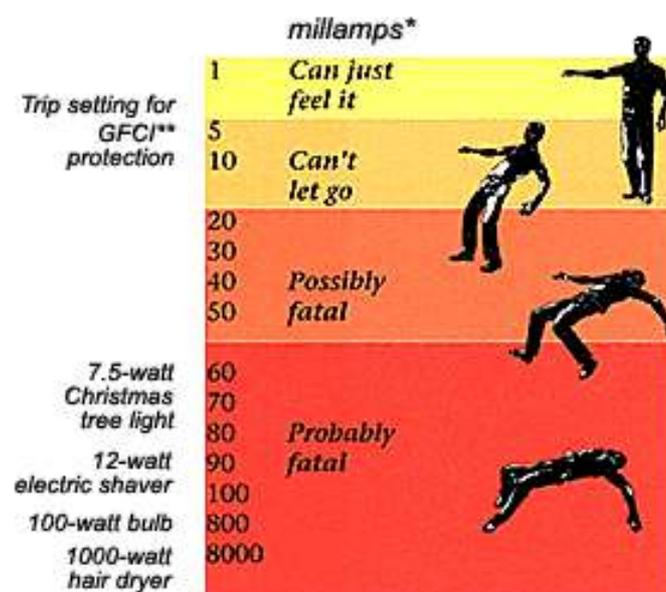
As an example, the first fatality directly attributed to solar panels was recorded in Dubai in 2018.

Ironically it was a small, 2 panel solar panel system on a caravan that caused the fatality! In addition, there have been a number of firefighter injuries attributed to solar PV systems in countries such as Switzerland, the UK and the USA just to name a few.

\* A milliamp is 1/100<sup>th</sup> of an ampere, a measure of electrical current

\*\* A GFCI is a ground Fault Circuit Interrupter, a device which protects against serious shock.

### Just A Little Current Can Kill



## RISK ASSESSMENT MATRIX: FIRST RESPONDERS AND SOLAR PANELS

**Factors to consider.** Work Health & Safety (WHS) regulations require Persons Conducting a Business or Undertaking (PCBU) to undertake a hazard and risk assessment. The hazards are:

- Exposure to dangerous and potentially fatal levels of DC current.
- Exposure to possible respiratory hazard if near to damaged or burning panels.
- Hazards from working at height and additional trip hazards when working in vicinity of panels.

**Risk Assessment for risk of exposure to electrocution at an incident involving (but not confined to) solar panels.** For each hazard a PCBU must:

- 1 Consider what can go wrong
- 2 Determine how likely it is to happen (**PROBABILITY**)
- 3 Determine how bad the outcome would be (**CONSEQUENCE**)
- 4 Calculate the risk level

The risk table below is an example table for the electrocution hazard of solar panels. PCBUs may have a different risk appetite and view of probability and consequence. This table demonstrates that due to the risk of a critical or severe injury (consequence), highest level risk control measures should be put in place.

Unless it can be shown that the cost of the measure is grossly disproportionate to the benefit gained; then the measure is considered reasonably practicable and should be implemented. A cost effective, accredited, light blocking coating should be provided to all first responders as a risk control measure - light blocking “shut down” is the highest risk control measure.

**CONSEQUENCE**

**Death or critical injury**, significant public interest and regulatory intervention occurs or reasonably will occur.

**Severe injury**, such that public interest and/or regulatory intervention occurs or reasonably will occur.

**Major injury**, public and regulatory interest is high, but localised and short term.

**Minor injury**, public and regulatory interest is high, but localised and short term.

**PROBABILITY**

**Frequent** - Likely to occur very often during the operational life of an individual or very often at incidents.

**Probable** - Likely to occur several times during the operational life of an individual or very often at incidents.

**Occasional** - Likely to occur sometimes in the life of an individual or sometimes at incidents.

**Remote** - Unlikely, but possible to occur sometime in the operational life of an individual at some time at incidents.

**Improbable** - Highly unlikely to occur in the operational life of an individual.

**Consequence**

		Critical	Severe	Major	Minor
Probability	Frequent	1	1	1	3
	Probable	1	1	2	3
	Occasional	1	2	3	4
	Remote	2	3	3	4
	Improbable	3	3	3	4
		<b>Extreme</b> Urgent action required	<b>High</b> Action plan and senior management attention needed	<b>Moderate</b> Specific management responsibility must be specified	<b>Low</b> Manage through routine procedures

## PVSTOP – HOW IT WORKS & WHY IT WORKS

PVSTOP is a simple solution to a complicated and technical problem. The coating is applied to solar panels, blocking the light and rendering the solar PV system electrically safe.

Later in this user guide we will outline the procedures on how to apply PVSTOP to solar PV arrays mounted in different configurations.

But firstly, we will briefly explain **how** solar panels generate electricity and **why** even just partial (40%) coverage of solar panels with PVSTOP will render any solar PV array electrically safe.

### COMMON STYLES OF SOLAR PANELS

Thin-Film



Polycrystalline



Monocrystalline



There are many types of solar panels available on the market and most panel manufacturers offer a range of models including mono and poly crystalline (also known as multicrystalline) varieties with various power ratings and warranty conditions.



Solar panel efficiency has increased substantially over the last few years due to many advances in PV cell technology including but not limited to:

- **PERC** - Passivated Emitter Rear Cell
- **Bifacial** - Dual sided panels and cells
- **Multi Busbar** - Multi ribbon and wire busbars
- **Split panels** - using half cut cells
- **Shingled Cells** - Overlapping cells
- **IBC** - Interdigitated Back Contact cells
- **HJT** - Heterojunction cells
- **Dual Glass** - Frameless double glass

Regardless of the type of solar panel, the technology incorporated into the panel or the level of efficiency that the panel generates, all solar panels operate on the same principle, they generate power by converting light into (DC) electricity.

Photovoltaic (PV) simply means converting light into electricity.

## HOW SOLAR PANEL (PV) SYSTEMS WORK



### SOLAR CELL

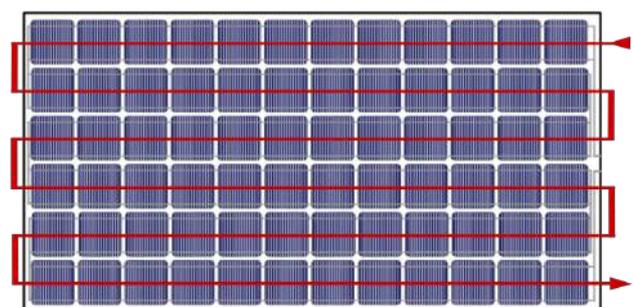
A solar panel is comprised of many small units called solar cells.

Solar cells produce power by allowing photons, or particles of light, to knock electrons free from atoms, generating a flow of DC electricity.

These solar cells are wired together in series to create a solar panel.

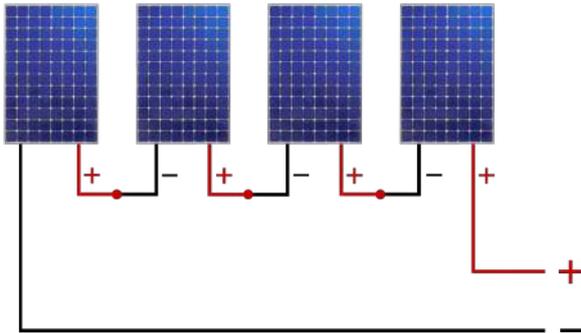
### SOLAR PANEL

A solar panel is comprised of a number of solar cells wired together in series to create a solar panel. The most common are 60 cell and 72 cell panels. The diagram (right) demonstrates how power flows through a solar panel.



*(Power flow through a solar panel)*

## SOLAR PANEL ARRAY



In turn, solar panels are connected together in series to create a string and the more panels connected together, the greater the power output of the solar PV system.

A residential solar PV system can have up to 600 volts of panels connected in series. A commercial or industrial array can have up to 1500 volts of panels connected in series.

## DIFFERENCES BETWEEN AC & DC ELECTRICITY

Solar panels produce **DC** electricity (**D**irect **C**urrent), the other type of electricity (grid electricity) is AC electricity (**A**lternating **C**urrent).

**AC** electricity creates a “frequency” which can be remotely detected by a voltage detector commonly referred to as an “AC HotStick”. The AC HotStick allows first responders or electrical technicians to identify if an AC electrical source is “live” without coming into direct contact with the AC electrical source.

**DC** electricity (produced by solar panels, batteries and electric vehicles) does not create a frequency and cannot be detected remotely. This means that first responders and electrical technicians cannot easily or safely identify if a DC electrical source is “live”. As such they always need to assume a DC electrical source is “live” and dangerous.

## HOW TO SWITCH OFF SOLAR PANELS

As long as solar panels are exposed to light they continually produce potentially lethal amounts of DC electricity, in professional terms this is known as the **DC Danger Zone** and up until now there has been no way to easily and practically “switch off” solar PV systems at the source (the solar panel cell level).

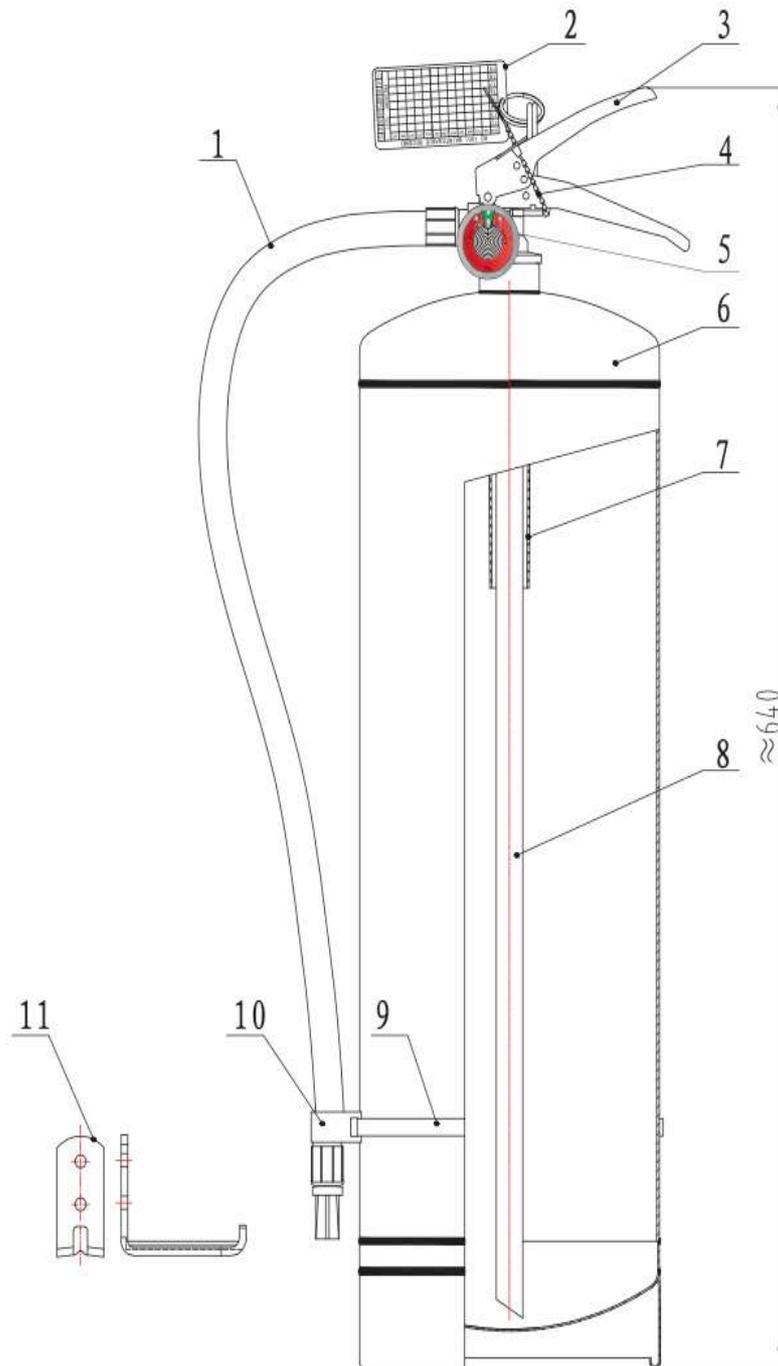
***The ONLY way to de-energise or “switch off” solar panels at the source of production (the solar panel) is to block the light – light is the source of power.***

# 02 ABOUT PVSTOP

PVSTOP is an environmentally friendly, state of the art, water-based polymer coating that is sprayed onto solar panels like a “liquid tarpaulin”, blocking the light and “switching off” the solar panel system in seconds. Once applied, the PVSTOP coating dries into a protective, non-flammable film which can be peeled off the solar panels without damaging the system when it is time to re-activate the PV system.

Because PVSTOP is designed to be used in emergency incidents such as fire, flood or storms as well as during routine maintenance, PVSTOP has a number of additional product safety features;

 <b>Fire Retardant</b>	 <b>Non-Flammable</b>	 <b>Non-Conductive</b>
<p>The coating will extinguish a Class A fire</p>	<p>The coating is non-flammable in both its wet and dry state</p>	<p>Protecting operators from the risk of electrocution</p>
 <b>Anti-Arcing</b>	 <b>Quick Drying</b>	 <b>Insulating</b>
<p>Isolates power at the source, extinguishing electrical arcs</p>	<p>Dries quickly into a waterproof, protective film</p>	<p>The coating protects against heat and encases any toxic nano-particles from being released from burning or arcing solar panels</p>
 <b>Protection</b>	 <b>Environmentally Friendly</b>	 <b>Global Accreditation</b>
<p>The coating does not damage the solar panels and once dry, can be easily peeled off the panels to re-activate the PV system</p>	<p>PVSTOP has been rigorously tested and verified by third party independent authorities around the world</p>	<p>ISO 14034:2016, Environmental Management - Environmental Technology Verification (ETV)</p>



- |                           |                          |                       |
|---------------------------|--------------------------|-----------------------|
| <b>1.</b> Hose assembly   | <b>5.</b> Pressure gauge | <b>9.</b> Bandage     |
| <b>2.</b> Direction board | <b>6.</b> Cylinder       | <b>10.</b> Hose catch |
| <b>3.</b> Valve assembly  | <b>7.</b> Plastic pipe   | <b>11.</b> Pothook    |
| <b>4.</b> Tamper seal     | <b>8.</b> Dip tube       |                       |

# 03 WARNINGS AND SAFETY INSTRUCTIONS

- **This PVSTOP device is NOT a fire extinguisher and must not be used as such.**
- Under no circumstances should parts of the device be tampered with or should an effort be made to remove parts.
- Under no circumstances should anyone try to loosen or remove a valve from a pressurised cylinder. Furthermore, under no circumstance should someone remove a valve from an empty cylinder, unless this person has been specially authorised to do so and has the necessary knowledge and equipment to prevent damage to the valve, the cylinder, properties and persons.
- This PVSTOP device is only supplied for the use for which it is designed and under no circumstances should it be used for other purposes.
- Do not change or convert any part of this device without direct instruction, guidance and authorisation from PVSTOP.
- Do not drill, saw, weld, cut or in any other way tamper with the device as doing so may cause the device to become defective or dangerous.
- Do not put the device or any parts of the device into hot or boiling water, close to heat sources such as radiators, electric heaters, open fires or other appliances that generate heat.
- The information given on the device label is important and may not be removed or changed unless approved by an authorised person.
- Do not drop the device or components of the device from height, as this can cause damage to the device.
- Do not throw the device into a fire, as this can cause crack formation and/or render the device inoperable.
- Do not spray the contents of the cylinder onto people or animals. When a canister has been used, it must be taken out of circulation and labelled as empty pending replacement.
- Manual handling precautions must be taken when deploying heavier PVSTOP devices.
- Do not use the device if outside the three-year warranty period.
- Never drain contents of canister into sewer or water system.

# 04 SITUATIONAL AWARENESS

It is imperative that a high level of **situational awareness** is exercised before, during and after the application of PVSTOP.

A dynamic risk assessment process must be adopted to ensure safety and effectiveness of application.

This should include as a minimum the constant assessment of:

- Access and egress routes
- Structural integrity of the roof or panel installation site
- Fire and smoke related risks
- Air quality
- Risk of falling debris
- Personnel life safety
- Power output
- Safety of bystanders and other personnel
- Impact of overspray on surrounding property

# 05 OPERATION



**In the event of fire, call the relevant emergency services agency in your country/region immediately. Do not attempt to engage an active blaze without appropriate personal protective equipment. If heat, smoke, or structural integrity prevents access to PV panels, await the arrival of trained emergency personnel.**



**PVSTOP is effective on all types of solar PV systems including;**

- Grid Tied Systems
- Grid/Hybrid Systems
- Off Grid Systems



**PVSTOP is effective on all types of inverter systems including;**

- String (or centralised) Inverter systems
- Micro-inverter systems
- Power Optimizer (or string inverter + power optimiser) inverter systems

## QUICK FACTS

- $P \text{ (watts)} = V \text{ (volts)} \times I \text{ (amps)}$
- 40% coverage of PVSTOP across the centre of the solar panel array will render the solar panels electrically safe
- There will still be volts (V) present in the PV system as light is still being received by the uncoated solar cells, however the 40% coverage breaks the circuit, reducing the amps (I) to zero
- As an example, a residential solar system with 40% PVSTOP coverage may still be producing significant voltage, but with 0 amps, the system is producing 0 power
- $(100 \text{ volts} \times 0 \text{ amps} = 0 \text{ watts})$
- Although 40% coverage of PVSTOP will render the solar panel array electrically safe, the objective should always be 100% coverage as a 'best practice' procedural measure

# BEFORE APPLYING PVSTOP



## HEALTH & SAFETY

The PVSTOP compound is non-toxic and non-conductive. When applied to the surface of solar panels, the coating is non-flammable in both its wet and dry states. The dry coating waste may be disposed of as low hazard. Please see separate Material Safety Data Sheet (MSDS) for further Health and Safety Information.



## PVSTOP OPERATOR

PVSTOP should only be applied by a trained operator such as fire and emergency services personnel or electrical contractors. Under no circumstances should PVSTOP be handled or applied by untrained personnel who have not received risk assessment training.



## RISK ASSESSMENT

Conduct an appropriate 360° risk assessment of the site and surrounding vicinity, including safety of the location, ventilation and escape routes. Safety of the operator is paramount at all times.



## COVERAGE RATE

The theoretical coverage rate of the PVSTOP compound is approximately 5m<sup>2</sup> per litre (204ft<sup>2</sup> per gallon) at a WFT of 250 Microns. Practical coverage rates will fluctuate depending on variables such as:

- Distance from application target
- Environmental conditions (wind speed, wind direction, precipitation etc)
- Skill level of the operator
- Wet film thickness applied to the solar PV array (thicker application decreases coverage and increases drying time)



## DELIVERY RANGE

In ideal conditions, PVSTOP has a delivery range of up to 10 meters (30 feet). Always start application by applying PVSTOP to the furthest point of the PV array as delivery range will reduce as pressure is released from the canister.



## WEATHER EFFECTS

Environmental factors such as wind speed, wind direction and precipitation (rainfall) will affect the delivery range and performance of the product.



## VISIBILITY

The operator must ensure a clear line of sight to the PV array, if the operator cannot see the array, it will not be possible to apply the product accurately.



## OVERSPRAY

**Be aware of the impact of over-spray of the product on surrounding surfaces and property.**

PVSTOP will peel off smooth, flat surfaces, but will stick to porous surfaces.



## DISCHARGE TIME

A 9-litre (2½ gallon) PVSTOP portable canister has a continuous discharge time of approximately 48 seconds. (refer to product specification sheets for discharge time on other canister sizes).

# PVSTOP APPLICATION

## GENERAL OPERATING INSTRUCTIONS

1

Wear protective glasses, masks, gloves and any other relevant, available PPE when using the device.

2

Ensure an appropriate risk assessment of the vicinity has been performed, including safety of the location, ventilation and escape routes. Safety of the operator is paramount at all times.

3

Hold the canister vertically prior to operation.

4

**PULL** the safety pin.

5

**AIM** the nozzle.

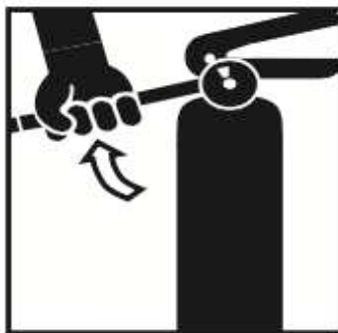
6

**SQUEEZE** the lever.



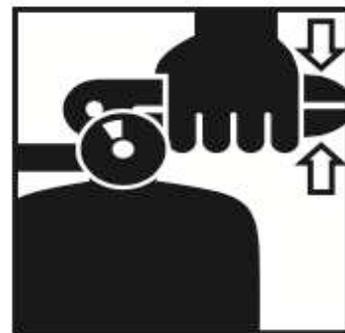
1 Remove safety pull-pin

**PULL**



2 Aim the hose nozzle at the solar panels

**AIM**



3 Depress the handle

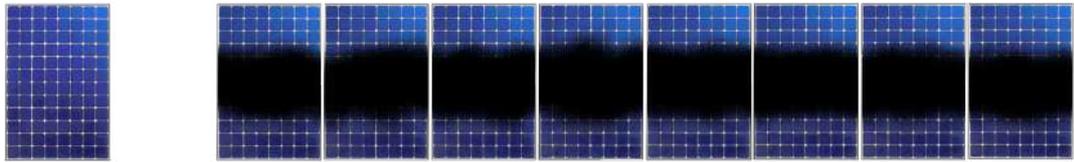
**SQUEEZE**

## PANELS IN PORTRAIT ORIENTATION

### STEP

# 1

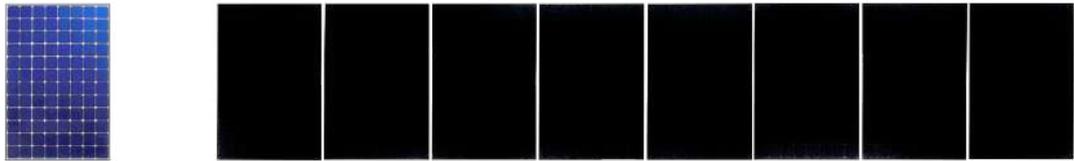
Apply a strip of PVSTOP across the centre (40%) of the solar panel array.



### STEP

# 2

Continue to apply PVSTOP until the solar panel array is completely coated or until the PVSTOP canister is empty (for additional safety, panel protection and allows the coating to be more easily peeled off post application).

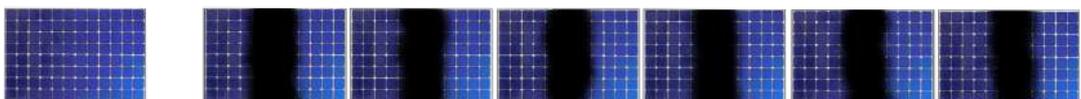


## PANELS IN LANDSCAPE ORIENTATION

### STEP

# 1

Apply a strip of PVSTOP across the centre (40%) of the solar panel array.



### STEP

# 2

Continue to apply PVSTOP until the solar panel array is completely coated or until the PVSTOP canister is empty (for additional safety, panel protection and allows the coating to be more easily peeled off post application).

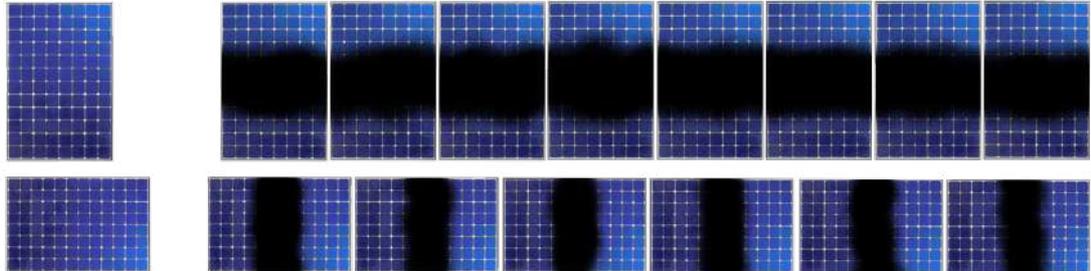


## PANELS IN MIXED ORIENTATION

### STEP

# 1

Apply a strip of PVSTOP across the centre (40%) of the solar panel array.



### STEP

# 2

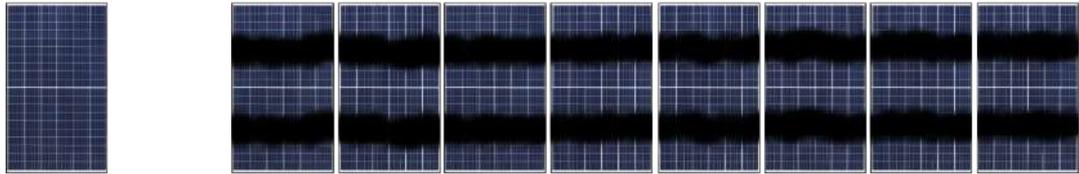
Continue to apply PVSTOP until the solar panel array is completely coated or until the PVSTOP canister is empty (for additional safety, panel protection and allows the coating to be more easily peeled off post application).



## SPLIT PANEL DESIGN

### STEP 1

Apply a strip of PVSTOP across the centre (40%) of the solar panel array.



### STEP 2

Continue to apply PVSTOP until the solar panel array is completely coated or until the PVSTOP canister is empty (for additional safety, panel protection and allows the coating to be more easily peeled off post application).



## QUICK FACTS

- If in doubt about what type of solar panels you are coating, 100% coat all the solar panels for maximum safety.
- If possible, locate the solar PV system inverter LCD display to confirm that the PV system is no longer producing power before taking any further action.

# PVSTOP POST-APPLICATION INSTRUCTIONS



## ELECTRICAL ISOLATION

PVSTOP will de-energise the solar PV array as soon as the product is applied in its wet state.



## DRYING TIME

Applied at an ambient temperature of 25°C (70°F) at a Wet Film Thickness (WFT) of 250 microns, the coating will be 'tack dry' in approximately 4-5 minutes. Higher panel surface temperatures and higher ambient temperatures reduce the drying time. Conversely lower panel surface temperatures and lower ambient temperatures increases the drying time.



## OPTIMAL COVERAGE

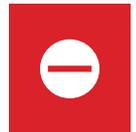
A minimum wet film thickness (WFT) of 250 Microns [100 Microns dry film thickness (DFT)] must be achieved, anything less may result in the product becoming difficult to remove.

- The coating is 'tack free' in approximately 120 minutes.
- Once 'tack free' the coating forms a waterproof, protective film that protects the coated surface until the PV system is ready to be re-activated.



## POROUS SURFACES

If PVSTOP is applied to porous surfaces, wash down affected area with water immediately. If PVSTOP is allowed to dry on porous surfaces it will be difficult to remove. A high-pressure water washer may be of assistance in removing PVSTOP from porous surfaces, but successful removal from porous surfaces is not guaranteed.



## REMOVAL

The dry film can be easily removed by hand, or alternatively, with a high-pressure water spray/pressure washer from most non-porous surfaces. If removed in freezing conditions, the coating may be brittle.





## DISPOSAL

The dry PVSTOP film is non-hazardous, environmentally friendly and can be disposed of as general solid waste.



## EXTERNAL WEATHER RESISTANCE

Up to 12 months weather exposure.



## CLEAN DOWN

Clean any equipment coated with PVSTOP with water immediately after use.

**Coating cannot be removed from woven materials once the coating is tack free** (such as personal protective equipment).

## PV SYSTEM RE-ACTIVATION

Under no circumstances is the property owner to touch or engage with the solar panel system or attempt to remove the PVSTOP coating that has been applied to the solar PV system. The system must be inspected and serviced by an authorised electrical technician prior to the PV system being returned to service.

# 06 MAINTENANCE



- Monthly inspection of the device is recommended.
- Keep the device clean. Do so with a damp cloth. Do not use aggressive cleaning agents.
- Check that the tamper indicator (safety seal) is still intact.
- Check the nozzle is clean and unobstructed.
- Check the locking pin quarterly to ensure that it is still in place.
- Ensure pressure gauge is pointed to the green zone. Contact your authorised dealer if this is not the case.
- Check for signs of damage or misuse. Make sure all label text is still readable.
- Carefully examine the surface of the extinguisher for corrosion. Corrosion can be prevented by cleaning the device if it gets dirty or wet.
- When you finish inspecting the device, put it back securely into the mounting bracket.
- Full-service inspections of the device should be carried out as advised by your PVSTOP representative.

## 07 STORAGE AND PLACEMENT

- The device should be hung on the accompanying pot hook or PVSTOP storage cabinet at a level best suited to the user. Appropriate brackets must be used for the size of cylinder you are mounting.
- The device must be hung in conspicuous places where it can be seen easily by persons heading towards the location of the PV panels.
- The device should not be hung in places where a fire could block the access to the device or in small corridors where it could be knocked down or displaced from the wall. A minimum clearance of 1000mm is recommended.
- Avoid unnecessary contact between the device and extremes of temperature (hot or cold) so that the storage temperature recommended for the device is not exceeded.
- The instructions on the device must be easy to read.
- Signage should clearly indicate the location of the PVSTOP device and other relevant firefighting equipment so as to not confuse the two.
- PVSTOP devices must be thermally protected IF installed in locations where the temperature is outside the recommended storage range of 5°C to 30°C. DO NOT ALLOW LIQUID TO FREEZE.
- A PVSTOP heavy duty storage cabinet is available to purchase separately.

## 08 POISONS INFORMATION

- If PVSTOP comes into contact with skin, wash with soap and water as soon as practical. If irritation continues, seek medical attention.
- If PVSTOP comes into contact with eyes, wash with water immediately and seek medical attention.
- For all other exposure, refer to the PVSTOP Safety Data Sheet.

# 09 APPENDIX

## APPENDIX 1: SERVICE INSTRUCTIONS

### PVSTOP PORTABLE PRESSURE VESSEL Service Instructions – 9.0L PVSTOP - Stored Pressure Type

#### SIX MONTHLY SERVICE AND INSPECTION

##### Bracket

- Ensure the safety pin is correctly inserted, remove extinguisher from wall/vehicle bracket and ensure the bracket is firmly mounted.

##### External Observation

- Check for corrosion, abrasions, dents etc. If the extinguisher is damaged it must be condemned.
- Once an extinguisher has been condemned release the pressure by carefully undoing the operating head by 2 full turns.
- Check the label is intact and correct and the operation/service instructions are legible.
- Check the hose for splitting or cracking and that the nozzle is not blocked.
- Check the safety pin is in place and the plastic security tie is intact.

##### Operational Check

- Weigh the extinguisher to ensure the mass is as per the gross weight on the label.
- Check that the pressure gauge needle is in the green section of the dial. If the needle is not in the green section, depressurise the extinguisher by carefully undoing the operating head by 2 full turns.

##### Depressurised Extinguishers

- Once an extinguisher is depressurised check the year of manufacture, which is stamped on the cylinder body.
- NOTE: Cylinders over 5 years from manufacture must be hydrostatically tested.

##### Service Conclusion

Once the extinguisher has passed all the tests it must be placed back on its bracket and the metal tag attached to the extinguisher must be updated with the date of service.

## APPENDIX 2: PRODUCT INFORMATION SHEET

### Description

PVSTOP is a temporary peelable protective coating that when applied to the surface of solar panels is designed to isolate the power produced by the solar panel system. Applied in a liquid state, the coating dries to form a protective barrier that will last for up to 12 months. **DO NOT USE ON ACRYLIC SURFACES.**

### Material Type

Water Based Polymer

### Colour

Black

### Surface Application

Solar PV Panels

### APPLICATION INFORMATION

#### Delivery System

Specialised stainless steel, portable fire extinguisher vessel, the design and certification of which complies with the relevant pressure vessel and portable fire extinguisher standards within the relevant country or jurisdiction.

#### Application

A minimum wet film thickness (WFT) of 250 Microns [100 Microns dry film thickness (DFT)] must be achieved, anything less may result in the product becoming difficult to remove.

### Health & Safety

The compound is non-toxic and non-conductive. When applied to the surface of solar panels, the coating is non-flammable in both its wet and dry states. The dry coating waste may be disposed of as low hazard. Please see separate Material Safety Data Sheet (MSDS) for further Health and Safety Information.

### Storage

Shelf life, from date of manufacture is 36 months when stored in an approved fire extinguisher type pressure vessel or 24 months when stored in an Intermediate Bulk Container (IBC). Store at temperatures between 5°C – 30°C. **DO NOT ALLOW LIQUID TO FREEZE.**

### Drying Time

A WFT of 250 Microns will be tack free in approximately 120 minutes at an ambient temperature of 25°C. Higher panel surface temperatures and higher ambient temperatures reduce the drying time. Conversely lower panel surface temperatures and lower ambient temperatures increases the drying time.

### Coverage

The theoretical coverage rate is approximately 5m<sup>2</sup> per kg at a WFT of 250 Microns.

### Removal

The dry film can be easily removed by hand, or alternatively, with a high-pressure water spray/pressure washer from most non-porous surfaces. If removed in freezing conditions, the coating may be brittle.

### Clean Down

Clean any equipment coated with PVSTOP with water immediately after use. COATING CANNOT BE REMOVED FROM WOVEN MATERIALS ONCE THE COATING IS TACK FREE (such as personal protective equipment).

### External Weather Resistance

Up to 12 months weather exposure.

### Technical Information

#### Tensile Strength

>5 MPa

#### Flashpoint

N/A

#### Viscosity

<12000 mPas @ 20°C (Cone & Plate)

#### pH

7-8

#### Specific Gravity

1.02 (H<sub>2</sub>O = 1 @ 20°C)

#### Adhesion

<1.0 MPa

#### Solids Content

45 + 2%

#### Maximum VOC

80gl<sup>-1</sup>

#### Elongation

>1000%

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