

Non-Chemical Weed Control: Steam Weeder

Project Overview

A collaboration between UK
PPD Grounds, UK CAFE, & UK
Arboretum



University of Kentucky
College of Agriculture,
Food and Environment
Cooperative Extension Service

Weedtechnics SW800 saturated-steam weed control machine



Unit Overview

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Unit Start-up, Operation, and Shut Down Procedures

Weedtechnics SW800 saturated-steam weed control machine



Unit and Operations Summary



Winter creeper treatments



UK Grounds liked the steam weed unit enough to invest in an additional, more portable unit through a new grant this spring.

Components



Weedtechnics
SATUSTEAM™ WEED CONTROL
Patented Saturated Steam technology
www.weedtechnics.com

Steam Weed Control Background

- Wet heat has been shown to be an effective alternative to chemical control or dry heat (fire) and may be more appropriate based on environmental, human health, and other considerations.
- 230-250 F in the machine; 205-218 F at the point of application.
- Shallow penetration into soil reduces harm to microbiota.
- Can stimulate seed bank germination which might require multiple treatments but can help exhaust regrowth.
- Indicated as safe for application near ornamentals and trees.

Safety- Personal Protective Equipment (PPE)

- Proper PPE Required:
 - Insulated heat resistant gloves
 - Safety glasses
 - Boots or sturdy work shoes
 - Long pants and long sleeves, if possible
 - Ear protection

Safety- Precautions

- Be aware of which components of the device are hot and avoid contact.
- Ensure red safety cover is appropriately affixed over the white hose cover. The potentially hot fittings or blue water delivery hose within the protective white and red shrouds should never be exposed during use at operating temperatures.
- Operate outdoors only. Exhaust from the unit contains poisonous carbon monoxide.
- Ensure proper ventilation around unit to ensure air cooling occurs as much as possible.

Safety- Hose Management Best Practices

- Inspect hose and fittings for leaks and abrasions at startup of use during cool water flush. Repair any leaks and abrasions as soon as noticed and prior to running hot water through the system.
- To reduce risk of injury from a damaged hose, avoid:
 - Dragging hose across abrasive surfaces
 - Exposing the hose to heat above 302 F
 - Exposing hose to fuels or solvents
 - Pulling the hose into or wedging between surfaces
 - Kinking the hose
 - Pulling the hose solely by the applicator gun
 - Running over the hose with a vehicle

General Operations Best Practices

- If you disengage trigger for more than a minute or two, stop burner to avoid fitting damage.
- Around 1,050-1,100 PSI is a good pressure range to start with. Setting will vary based on ambient temperature.
- Level the thermostat needle out between 230-250 F.
- Do not exceed 250 F or it will cause the burner to cut out.
- Clear lines and winterize machine for winter storage.
- Treat weeds soon after germination, when they are tender.
- Turn off burner and ignition switches at end of day to avoid draining batteries.
- Ensure heat shroud and hose guard are covering hose and wand.

General Operational Notes

- 5 L/minute or about 80 gal/hour water use.
- Hood can be directly sealed onto the ground and drug.
- Spot applicator should be held no more than ~ 2 inches from target for spot treatment.
- Pressure washer nozzles included to utilize the machine as a hot or cold pressure washer for up to 2,000 PSI pressure washing.
- Burner cuts out when there is no flow.

Equipment Check Prior to Starting

1. Check fuel and fluids prior to attempting to start.
 - Water- consumes ~80 gallons/hour of use
 - Diesel- consumes ~1 gallon/hour of use
 - Unleaded Gasoline-consumes ~ $\frac{1}{4}$ gallon/hour of use
 - Engine oil
 - Pump oil
2. Connect wand to hose and take hood off the wand to avoid nozzle clogging with soot/debris during initial startup procedure that flushes system from previous use.
3. Unspool hose and inspect for any obvious damage.

Startup Procedure

1. Hold wand in one hand and engage trigger. Lock in place to prime pump by allowing flow through system.
2. Place pump engine in on position, engage the choke, turn on with key, and then switch off the choke.
3. Allow the wand to discharge freely until the water is clear.
4. After clear water, turn off wand and attach desired applicator head.
5. Check flow from the applicator head.
6. Set burner thermostat to maximum; turn on burner switch.
7. ~1,000 PSI is a good starting pressure. Adjust as needed to help achieve target temperature.
8. Temperature should level out between 230-250 F.

Application Procedures

- Apply as needed to desired target for necessary duration to achieve control.
 - Project has determined an application rate of 2-4 seconds per linear foot of application is effective for weed and invasive control for most species. Results may vary and application time may need to be adjusted accordingly.
- Monitor treated sites for fresh germination after initial treatment. Subsequent treatments may be necessary.

Shutdown Procedures

1. Turn off burner thermostat.
2. Discharge water to blow out soot.
3. Turn off burner
4. Flush system with cool water for 1-2 minutes.
5. Test wand for temperature with back of hand after ~2 mins of cooldown to ensure it is cool enough and shut off pump.
6. Shut off pump by throwing the kill switch.
7. Roll up hose and lock reel.
8. Conduct walk around and remove safety cones from working area.

Components

- Trailer
- Water Tank
- Valve after tank with an inline filter
- Pressure adjustment knob on the unloader
- Bypass valve and line back to tank
- Pressure switch to trip the burner
- Flow switch to trip the burner
- Pressure release valve set to 2800 PSI
- Safety valve after burner with a temperature gauge that runs to the applicator hose and wand with insulated shroud and hose cover (quick disconnect fittings on the hose and applicator wand)
- Applicator hood with quick disconnect. This should help reduce collateral damage. An open applicator (shower head design)
- 6.5 HP gas engine to drive the pump. Key start ignition with a 12 V battery to start
- Pressure gauge for pump
- Heating Coil- 12V diesel burner system with temperature gauge
- Hose
- Applicator Gun

Components

- 5 fluids- check before each use
 - Water-about 80 gallons per hour of use
 - Diesel- about 1 gal/hour of use
 - Unleaded- Gasoline $\frac{1}{4}$ gal/hour of use
 - Engine oil
 - Pump oil

Contacts

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Byron Lafferty with Steam Weed Inc for additional support and parts