

Improved Prokopack Aspirator—Model 1419

Instructions

Background information

Our CDC Backpack Aspirator, Model 1412 was originally developed on the basis of work by the U. S. Public Health Service in San Juan, Puerto Rico; it was primarily for surveillance of *Aedes aegypti* in the context of dengue (Clark *et al.* 1994). Since then, the Model 1412 has become essentially the gold standard for this type of work (Vazquez-Prokopec, *et al.*, 2009). The Improved Prokopack Aspirator was developed in 2009 and evaluated in sewer tunnels in Atlanta, Georgia, UDA and in the domestic environment in Iquitos, Peru.

The Improved Prokopack Aspirator was developed for indoor sampling of resting mosquitoes such as *Aedes aegypti*, *anopheles*, and *Culex*. Aspirations of resting adults

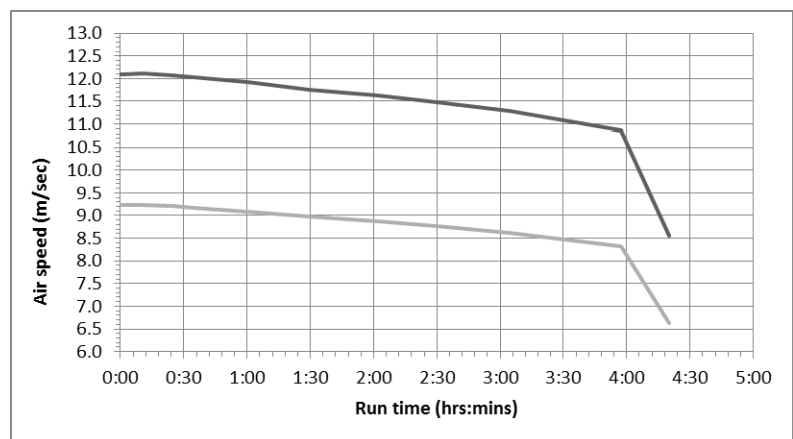


produce collections of both sexes and all physiological stages directly from their resting sites, allowing better estimations of species diversity, abundance, sex ratio, age structure, and physiological status (Silver 2008).

The aspirator itself, at 23 ounces (650 g) it is light weight and highly maneuverable; with the included extension pole the unit can sample from ground level up to 13 feet (4 m). This enables collections to be made on upper walls, ceilings, and under furniture. Also included with the 1419 is (1) a 12 volt 12 amp hr gelled-electrolyte battery, an extension pole, five collection cups and lids with stainless steel mosquito mesh, a universal voltage automatic charger (100-240 VAC, 50/60 Hz, 5 amps per hr) permitting complete recharging in 2.5 hours. Run time is four hours.

Design Characteristics

Our Improved Prokopack Aspirator incorporates several significant improvements to the original design. By optimizing the air flow we have improved intake air speed by 15% while reducing current consumption by 33%. As can be seen in the figure (right), these improvements result in a runtime of four hours using the supplied 12 volt 12 amp hr battery. In the figure, the darker line is for the standard (mosquito) mesh screen in the collection cup, the lighter line reflects the fine mesh sandfly screen collection cup.



Operational Details

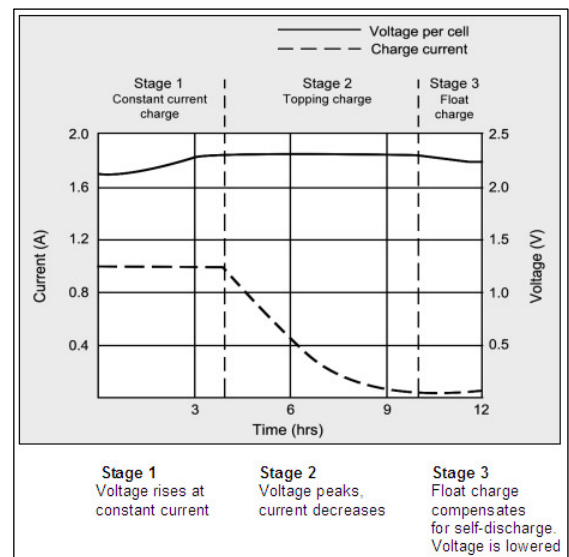
Operation is simple. Place your battery in the outer compartment of the backpack (supplied) and attach the power cord (red and black indicate positive and negative polarity, respectively). The power cord is four meters in length (*ca.* 13 feet) so that the extension pole can be used to extend the reach of the aspirator; if you are not using the extension pole, before zipping up the battery compartment, stuff the excess cord inside with the battery. The larger compartment can be used for storing your collection cups. Insert a collection cup with a slight twisting motion into the aspirator until it fits snugly. The aspirator is turned on with a rotary switch located by the handle. After collections have been made, remember to put the lid on the collection cup before turning the unit off.

The Model 1419 is supplied with six collection cups with stainless insect screen sized for mosquitoes (additional sets of six lids and screened cups are available, PN 1.0); fine mesh cups for sandfly collections (PN 1.01) have a finer screen and restrict the air flow *ca.* 3 meters per second (see figure above).

Charging information

The unit comes supplied with a 12 VDC 12 AmpHr Gel-Cell battery (PN 2.35). A new and fully-charged battery will provide power for a little more than four hours of continuous use at intake speeds ≥ 11 meters per second. The aspirator motor consumes about 2.5 amps per hour when running. As batteries age, you can expect some loss of capacity and run times will therefore decline accordingly.

The Improved Prokopack Aspirator comes supplied with a fuse-protected and fully automatic 5 amp hour charger (PN 2.7) that senses the battery state and charges accordingly. This is a charger designed to accommodate the majority of voltages and frequencies found worldwide (100-240 VAC and 50 or 60 Hz). It charges in three stages: [1] the initial constant-current charge, [2] the topping charge, and [3] finally the float charge which can continue indefinitely without battery damage. The constant-current charge applies the bulk of the charge and takes up roughly half of the required charge time; the topping charge continues at a lower charge current and provides saturation, and the float charge compensates for the loss caused by self-discharge. The figure illustrates these three stages. This unit can recharge a fully-discharged battery in about 2.5 hours.



Spare parts

- Extra aspiration cups (sold in sets of 6; please specify fine (PN 1.01) or regular mesh (PN 1.0)).
- 12 volt 12 amp hour battery (PN 2.35).

Some Useful References

Clark, G. G., H. Seda, and D. J. Gubler. 1994. Use of the "CDC backpack aspirator" for surveillance of *Aedes aegypti* in San Juan, Puerto Rico. *J Am Mosq Control Assoc.* 10(1): 119-124.

Vazquez-Prokopec GM, Galvin WA, Kelly R, Kitron U. 2009. A new, cost-effective, battery-powered aspirator for adult mosquito collections. *J Med Entomol.* 46(6): 1256-1259.

Silver, JB. Mosquito ecology: Field sampling methods. *Vol. 3rd.* New York: Springer; 2008.

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