TECHNICAL ARTICLE SERIES

Pumping Solder Flux

ARTICLE # TL-119

INDUSTRY: Chemical

ENTITY: Teledyne Halco

SOLUTION(S) PUMPED: Hydrochloric acid, Solder flux

PUMP TYPE(S): FLEX-I-LINER Sealless Self-Priming Peristaltic Pumps

Vanton Pump & Equipment Corp.
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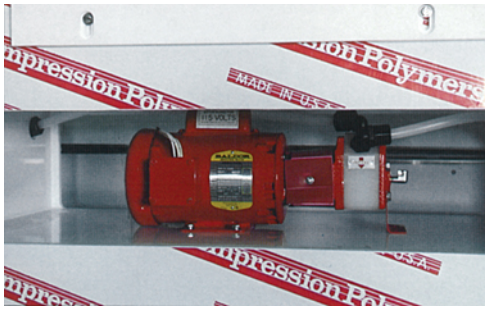
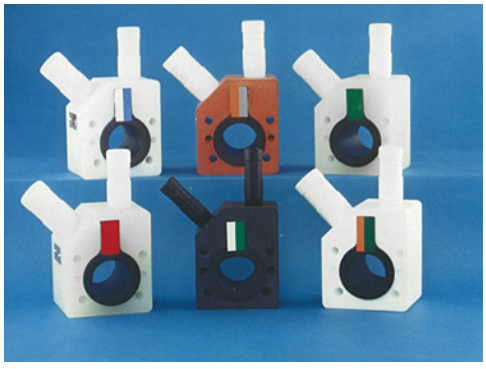
A Teledyne Halco portable fluxer unit with a Vanton close-coupled, self-priming Flex-i-liner® pump.



Close-up view showing compact Flex-i-liner® positioned in fluxer cabinet.



Block and Liners of varying material. Flex-i-liner® pumps are available in a variety of engineered rigid plastics and elastomers enabling them to safely handle just about every corrosive or hazardous fluid over the full pH range. The most common materials are shown here. (Top row, left to right); Polyethylene body, Viton liner; reinforced Teflon body, Hypalon liner; Polypropylene body, Natural Rubber liner; (Bottom row) Polypropylene body, Buna-N liner; Carbon- Filled Teflon body, Neoprene liner; Teflon body, Nordel liner.

Pumping Solder Flux

Reprinted from PUMPS AND SYSTEMS MAGAZINE

Unique plastic pump distributes solder flux onto printed circuit boards

Pumping solder flux that contains 5% hydrochloric acid is a troublesome service. A unique plastic pump that uniformly distributes the flux onto printed circuit boards (PCBs) is critical to the performance of the horizontal solder leveling system developed by Teledyne Halco. Specifications call for uniform coating and metering of the aqueous flux as the PCBs move by on a conveyor at 30 feet/min. The pump, which operates continuously during eight-hour shifts, is designed so that only two non-metallic parts are in contact with the ethylene-glycol based flux.

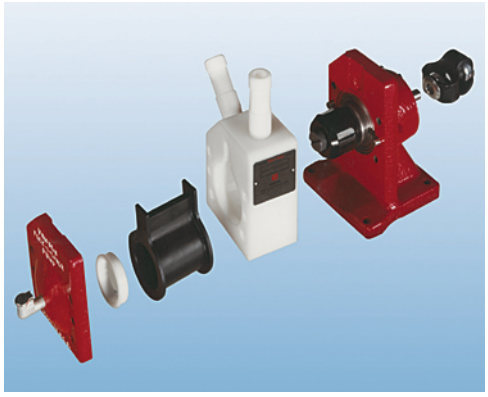
The Unicote® Horizontal Solder Leveling System is said to deliver the tighter hole tolerances, surface thickness, and uniformity of application that today's surface mount technology demands. On identical SMD pad configurations with solder thickness of 200 to 300 millionths of an inch at the crest, deviations of 50 to 60 millionths of an inch are typically achieved on 50 pitch and smaller.

The solder fluxer is a mobile, compact roller coating unit designed to apply flux formulations as specified. It is constructed as a polypropylene box frame with compartments for the pump and supply tank, both of which can be readily accessed.

The fluxer has three sets of conveyor rolls. The first and third sets run dry and are intended only for conveyance. The second set, constantly flooded by fluxing liquid, serves as the applicator in addition to providing conveyance. The rollers are designed with an inner core to provide rigidity and dimensional stability. Their outer surface is bonded to a thin-walled plastic tube. The entire roller coating assembly rests in a compartment at the top of the fluxer. The compartment serves as a drain conduit, returning excess flux to the supply tank below. A platform is provided directly under the chamber for the flux circulation pump, which must be self-priming and draw the flux from the supply tank for continuous, uniform distribution through manifolds to the circuit boards.

The Pump

The pump selected for this operation is a close-coupled Vanton Flex-i-liner® self-priming polypropylene pump with a flexible neoprene liner. It has no stuffing box, glands, shaft seals, check valves, or gaskets and it is completely sealless. The plastic components are totally resistant to the flux, and the design is ideal for handling viscous materials. Fluid flow is confined to a channel formed by the outer surface of the flexible body block or pump casing. All mechanical action and moving parts are within the liner and are not exposed to the corrosive fluid. Movement of the fluid is controlled by a rotor mounted on an eccentric shaft that oscillates within the liner, creating a progressive "squeegee" action on the trapped fluid. The liner and pump casing are the only parts in contact with the pumped fluid, eliminating



Exploded view of Vanton pedestal mounted Flex-i-liner® pump showing basic simplicity of construction. No seals. No packing. No valves. No gaskets. Only two chemically inert parts —the flexible liner and body block —are in contact with the fluid.

any danger of contamination. The model selected for this service is a size 12, which has a capacity of two gallons per minute. It is driven by a ¼ Hp, totally enclosed electric motor operating at 1,450 rpm at 50 cycles (1,750 rpm at 60 cycles).

In addition to dependable, uniform operation, a significant feature of this pump is the ease with which it can be maintained and serviced. The only wearing part is the low-cost liner, which can be replaced in a matter of minutes without special tools. In addition, the pump can be run dry for extended periods without harm.

Teledyne Halco's Horizontal Solder Leveling Systems are recommended where high production rates are required on relatively thick boards (typically 0.062 in.), 18 in. x 24 in. Dwell time of the entire board as it passes through the 6 in. chamber is less than two seconds.