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Question:
I have a water soluble flux removal application. Which are better, Batch or Inline cleaners?

Answer:
There are many differences between batch-format and inline format aqueous cleaning systems. Because Aqueous Technologies manufacturers both technologies (batch and inline), we have no particular bias.

Our advice is application specific. It applies to water soluble applications. Our advice would be different if you had a no-clean or rosin based application.

There are both advantages and disadvantages with batch and inline equipment. We'll begin with inline equipment.

Inline equipment has its advantages over batch-format cleaning systems. Advantages include:

Throughput: In most applications, an inline cleaner is capable of cleaning more boards per hour than a batch machine.

Faster Turn-Around: If you only need one or two boards cleaned at a particular time, the time from board entry to board exit is usually less than in a batch machine.

Disadvantages of an inline machine include:

Cost: Cost can be separated into two categories:

Acquisition Cost: Inline machines cost more than batch machines. In most cases, inline prices start at about two times the cost of a batch machine (an can go as high ad 8 times).

Operational Costs: This is an area frequently overlooked by buyers. The operational costs of an inline machine are considerably more than a batch machine. To begin with, an average inline machine consumes three to four times the AC current than a batch machine. An inline machine generally requires more water, more DI media tanks, and more maintenance than a batch machine. The extra costs associated with inline machines are not necessarily an issue is your board volumes are high. It all comes down to the cost per board.

Environmental Issues: Because inline machines consume more water, they will produce

more waste. Discharging waste water from any cleaning system always has an associated cost. This cost can be found in discharge permits. Most municipalities require a permit for any discharge (hazardous or not). Because the discharge of any waste increases a company's potential liability exposure, one must somehow factor a cost for liability exposure. A closed-loop cleaning system will eliminate the exposure issues as well as reduce some of the operating costs.

Other environmental issue include space and noise. An inline machine requires more footprint than a batch machine. Don't forget, space is money. Noise is another concern. All inline cleaners generate more noise than batch machines. Determine in advance the decibel rating of the machine. Does your company have a decibel-meter-equipped Health and Safety officer?

Please do not get the impression that we am opposed to inline machines. On the contrary, we make a good living selling them. Just be sure that you can justify one.

Batch machines also have pro's and con's.

Pro: Allow be to dispel one myth associated with batch machines. A good batch machine is capable of cleaning as good or better than an inline machine. This is a fact. Batch machines, because they are not limited by a fixed conveyor length, are capable of cleaning or drying for as long as is required to obtain clean and dry boards.

Con: Batch machines are not as fast as inline machines. Although a batch machine can clean multiple boards at one time, high throughput can only be achieved if you have high quantities of boards ready for cleaning at one time. If your production line pumps out one board every ten minutes, and you want to clean that board immediately, a batch machine will choke your assembly line. If, however, your product line pops out one board every ten minutes and you can wait until you have a decent production lot before starting the cleaner, then production will not suffer. A batch machine's board holding capacity depends on both brand and board size. The smaller the board, the greater the capacity and likewise, throughput. If you can fit 45 boards at one time into a batch machine that takes under 20 minutes per cycle, then you can expect 135 boards per hour. That's not bad! But, if you choose to only place two boards at one time into the machine, expect a measly 6 boards per hour.

Pro: Some batch machines are equipped with a built-in resistivity meter that monitors the quality of the water flowing off the boards. With this feature, one may pre-program a cleanliness value and instruct the machine to continue the cleaning process until the cleanliness value has been achieved.

Pro: Batch machines use very little water. On a non-closed-loop model, an average batch machine will consume and discharge about 6 - 10 gallons of water per load of boards. Considering that DI water is not free, a fluid-frugal machine saves money. If you desire a closed-loop operation, batch machines are less expensive to close-loop.

Pro: Machine noise is far less than an inline. Many machines operate at about 60 dB (a relatively low number).

Our suggestion: Determine your throughput requirements. Contact multiple cleaning equipment manufacturers. Discuss closed-loop and open-loop considerations. Discuss potential board sizes to determine throughput and cost per board.