Washing 101

Buying a new production part washing system can be an overwhelming experience. With all the options and decisions to make, it is easy to overlook important details and end up with an unsatisfactory machine. The key decision to be made before purchase is what level of cleanliness will this equipment be expected to achieve.

Before deciding on equipment, the customer should outline the specifications to be met. For example, what is the production rate demanded? How dry is dry and how clean is clean? What are the guidelines regarding rust and spotting? How will the wastewater be disposed? These are all important concerns that, if answered thoroughly, will help the manufacturer select the perfect washer.

Buying an aqueous washer requires significant research analysis and an extended timeline to prove out a process, design a system to duplicate that proven process and build the machine to that design. The results needed to be attained determine the equipment to be purchased. Aqueous systems use water and mechanical action (such as spray impingement, immersion/agitation, ultrasonic energy, turbulation, or part motion) to clean soil from the part.

A successful aqueous cleaning process is based on 5 variables, which all contribute to the end goal of meeting cleanliness objectives. These include the material being washed, the soil being removed, the chemistry used to clean, the temperature of the solution and the mechanical action needed to remove that soil. Each variable effects the end product and a change in one variable effects the entire process. The key is to select a machine style that will be best able to utilize the information regarding these variables

Cleanliness specifications vary significantly, which means the customer must know how clean he considers clean. There are various tests that can be used to measure cleanliness. Subjective tests include the white glove wipe test, scotch tape test, and the UV light test. These methods rely on the subjective opinion of the individual performing the test and can vary from person to person so building a machine based on their results is strongly discouraged. Objective tests, conversely, which provide a quantifiable result include the Millipore test, particle measurement and particle count are preferred.

Dryness is another area of concern. The main factor in determining dryness specifications is the next manufacturing process the part will travel to. There are three types of dry and they include bone dry, flash dry within a certain time frame, and simply free of water puddles with no dripping. Examine the next step in the process to determine which of these is appropriate.

The final appearance of the part is another result to consider. When finished, should the part be free of spotting? What type of rust inhibitor, if any, should be applied? Is there a specific temperature the part must be upon exit from the washer?

Equipment selection will vary depending on the composition of the part, the soil to be removed and the production rate necessary to maintain. Additionally, blind holes, contours, and the size of the part to be washed are determining factors in equipment selection.

The soil that is cleaned from the part will help determine elements of the machine design along with playing a role in selection of cleaning chemistry. Soil can be judged on numerous factors. For example, particulates, metal chips, shop dirt, grinding chips, coolant and organic oils all require different methods of removal. This knowledge will

help determine how the cleaning fluid reacts in soil and how best to treat the cleaning solution during production to help garner consistent results.

With information about the cleaning specifications settled, it is possible to begin design of the cleaning process. Alkaline cleaning chemistry is dependent upon the soil and the material from which the part is made. Alkaline cleaners generally can use a low concentration of 1-4%. Consultation with an experienced, qualified vendor is important when picking the cleaning chemistry. They will be able to guide the customer through the selection process and find a chemistry to fit their unique needs.

The physical design of the washer is determined by the specifications, along with variables such as plant floor space, utility location, accessibility of service locations, and the ventilation requirements. Some plants use a central washer, others use a cellular method, and the decision between these two options will shape the design of the washer.

Washer designs come in 7 main forms. These are cabinet cleaners, immersion systems, ultrasonic systems, conveyor systems, indexing units, rotary auger drums, and return to operator systems. All have unique advantages and disadvantages. A qualified vendor will help the customer sort through the different options and select a washer design appropriate for their space and needs.

A customer that can follow the steps of washer design and partner with a qualified vendor will be able to efficiently create a new washer. Through careful planning and research, the customer will end up with a process that is able to clean their parts effectively and serve them for a long time.