Alliance

Manufacturing, Inc.

Helpful Information About Parts Cleaning Systems

When evaluating parts washers there are several elements essential to the performance and maintenance of any cleaning system. Critical items that should be considered with any cleaning system are construction, tank design, spray system, ease of maintenance, blowoff design, conveyor design, controls and safety. ***Not all parts washers are alike!***

Construction

Corrosion resistant fabrication materials: Water, heat and air are the ingredients that lead to corrosion. Corrosion will occur, regardless of chemical/rust inhibitors used. In addition, water quality throughout the country varies greatly, which can cause premature corrosion. Stainless steel, fiberglass, plastics, or similar corrosion-resistant materials are highly recommended. Solution pumps and exterior piping may be of other materials (unless otherwise dictated by the cleaning/rinsing process) since they are easily repaired and/or replaced.

Thickness or gauge of materials: Heavier wall materials generally equate to longer equipment life and better fit-up of components. Using lighter materials is a way for manufacturers to reduce their costs.

Tank Design

Volume: Tank volume should be at least 2 to 3 times greater than the pump GPM. Smaller tank volumes cause solution to turn over more often, not allowing contamination to settle out. Suspended contamination will be re-deposited back onto the parts and can cause nozzles to clog.

Sloped bottom: A sloped tank bottom will drain quicker and completely. Flat bottom tanks drain considerably slower. In addition, flushing sediment from a flat bottom tank is more difficult and time consuming.

Access: Tank access is very important for flushing the tank, visual inspection and trouble shooting. Should the drain outlet become clogged or pump suction become obstructed, access will be needed to correct these conditions.

Clean-out door: A clean-out door flush to the tank bottom should be included with the first tank of any cleaning system. The first tank becomes the most contaminated and requires periodic desludging. Rectangular doors are best for maneuvering squeegees and similar tools. Round clean-out doors should be avoided due to their limited access and shape. Round doors make sludge removal with squeegees and shovels more difficult.

Spray System

Pumps: Two (2) styles of pumps are typically offered, vertical and horizontal. Vertical seal-less pumps require less maintenance due to their seal-less design. Horizontal pumps will have seals, which need periodic replacing. Should a vertical pump need servicing, it can be lifted directly off the tank without draining the solution. Horizontal pumps often require the tank to be drained for removal. Should a pump need replacing, horizontal pumps are typically less costly.

Flow/pressure control with gauge: All pump discharge lines should have a flow/pressure control valve. Lightweight parts require pressure regulation to prevent them from being sprayed off the conveyor belt or being repositioned in a way detrimental to proper cleaning/drying. A pressure gauge is recommended for each pump discharge line for reference and for determining if nozzles are clogged.

Filtration: The first spray zone removes the heaviest amount of contamination. Therefore, a strainer or filter basket is required with a capacity sufficient enough to prevent frequent cleaning. Perforations in the basket should also be smaller than the orifice opening in the nozzles to help prevent nozzle clogging.

Secondary spray zones should have a coarse filtration basket or filter screens at a minimum. Again, the perforations should be smaller than the orifice opening in the nozzles to help prevent nozzle clogging.

Both filter baskets and filter screens separate solids from the solution and provide pump protection. When comparing both methods of filtering, filter baskets are better since they collect debris, where as, filter screens do not. Auxiliary filtration such as filter bags, cyclonic separators, etc. are customarily offered as options.

Drain zones: Adequate draining between spray zones is essential for minimizing cross tank contamination. Parts or parts baskets should not be longer then the drain areas between spray zones. Parts extending from one zone into another will create cross contamination problems.

Ease of Maintenance

Interior accessibility: This is critically important! Parts washers do a dirty job and in turn they become contaminated. Soils will accumulate inside the machine and nozzles will clog. All nozzles clog! Access to clean nozzles should be easy, safe and require little effort. If the operator or maintenance personnel feel any one of those three (3) conditions does not exist, chances are the machine will run for longer lengths of time before interior maintenance is performed. This, in turn, will have a direct impact on the cleaning performance and life of the machine.

Some manufacturers offer “access doors”. Typically, access doors offer very limited access making the removal of nozzles extremely difficult. In fact, with larger machines, nozzle maintenance can only be preformed by accessing the internal areas through the conveyor tunnel. Other machine designs require a steel canopy to be lifted from the machine which is time consuming, requires lifting equipment and exposes employees to a safety risk.

Some manufacturers offer “gull wing” hinged type doors, which offer reasonable access. However, employees will be exposed to dripping chemicals from the door in the “up” position. In addition, should the mechanism holding the door in its up position fail or should the door come down, an employee may be injured.

Alliance is the only manufacturer of cleaning systems offering safe, unobstructed access to all interior areas. Alliance's patented (U.S. Patent No. 5,630,435) "full access" canopy design allows fiberglass canopy segments to be easily removed without the need of hoists or tools. Our special overlapping joint design prevents steam and moisture from escaping without the need for gaskets or seals. As with other industries, such as over the road trucking and recreational boating, fiberglass composites have proven to be extremely durable and long lasting. Additional benefits include thermal efficiency and sound dampening.

The full access canopy design is available on several machine configurations as shown below.

Canopy In Place

Easy Removal

Complete Interior Accessibility

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Quick change nozzles: All nozzles clog, so removal should be easy and without the need of tools. Spray zones typically have many nozzles. The quicker each nozzle can be removed, cleaned and replaced will save a considerable amount of time. Alliance's clip-on nozzles are easy to remove without the need of tools. Screw-in nozzles require tools and can possibly cross thread causing damage to interior spray piping. Some applications require screw in nozzles due to design requirements. Manufactured tubes with nozzle orifices require the entire tube to be removed in order to clean only one nozzle opening. This is far too time consuming and manufactured tubes are not recommended.

Heating elements: Parts cleaning systems are typically heated by either natural gas, electricity or steam. Natural gas and electric heat sources are most common. For electrically heated systems, element design is critical to the life span of the heating element. Contaminants removed from the soiled parts can accumulate in the wash bath and on elements immersed in the bath. For dirty water applications, flat surface element geometry is recommended to reduce scaling, coking and degrading. Round/tubular style elements have greater surface area, which can accumulate sediment. Sediment build-up and scale will reduce element life.

Blowoff Design

Easy height adjustment: For optimum performance, air knives should be positioned as close as possible to the parts. This may require periodic product clearance adjustments of the air knives. Adjustable air knives (non-fixed) are best. Fixed air knives (non-adjustable) should be avoided. In addition, a design that does not require tools for making adjustments is recommended. Certain applications, such as indexing of fixtured parts, may require fixed air knives.

Angled air knife design: Air knives should be designed to prevent moisture from being blown onto parts that have already exited the blowoff area. Fixed angle knives will accomplish this. However, adjustable angle air knives offer greater flexibility. Angle adjustment may be beneficial when conveying light parts.

Solution collection: All solution blown-off should be collected and drained back to the last solution tank thus reducing water and chemical consumption.

Lower air flow control: Air knives located below a conveyor belt should have a slide gate or similar air flow control device. High velocity air knives located below the conveyor may blow light parts off the conveyor or not allow them to pass.

Conveyor Design

Belt support: Conveyor belts are typically supported by a "slider bed" or rollers. Slider beds incorporate angles of flat bars placed on edge with wear strips attached. Due to the friction of the moving belt, wear strips require frequent maintenance. In addition, if not captivated, wear strips may shift causing excessive wear to the conveyor belt or may cause a conveyor jam.

Conveyor rollers greatly reduce the friction commonly caused with "sliderbeds", thus allowing heavier loads to be conveyed. Rollers also require far less maintenance since the friction load is reduced and there are no wear strips to replace. Cross contamination between solution tanks is also eliminated with rollers. Whereas, water may travel across slider bed supports between spray zones causing cross tank contamination and/or overflow conditions.

Variable speed: Variable conveyor speed allows the flexibility of increasing the through put should an increase in production occur. In addition, the conveyor speed can be slowed for parts that are difficult to clean and/or dry. Variable speed controls may be mechanical or electrical. Keep in mind that faster conveyor speeds equate to less time in the spray and blowoff zones, which will impact cleaning and drying.

Product side guides: All conveyors should incorporate side guides to prevent parts from falling off the conveyor.

Open belt design: Conveyor belts need to be as open as possible to minimize part to belt surface contact for optimum cleaning and reduce the amount of moisture conveyed into blowoff/dry zones. In addition, conveyor belts with maximum open area minimize cross tank contamination. Galvanized steel or stainless steel flatwire belts typically offer the most open area. Plastic conveyor belts are far less open, may have greater load restrictions and often are heat sensitive.

Jam protection: All conveyor systems and rotary table designs should incorporate a jam sensing device to prevent damage to the equipment and parts being cleaned. Sensors may be electronic or electro-mechanical.

Controls

Independent controls: All devices such as pumps, blowers and heating circuits should be independently controlled with their own on/off switches. This is particularly important for trouble shooting and process flexibility.

Independent heating circuits: All heating circuits should be controlled by their own dedicated temperature controllers. Actual and set-point temperatures should be displayed continuously for easy visual monitoring. "Actual" and "set-point" readout inform the operators when the machine is ready for use and aids in troubleshooting. Should solution/air temperatures not reach their set-point, there may be a damaged heater or malfunction of the heating circuit.

In addition, high temperature shut-off alarming should be provided to prevent damage to machine components and/or parts being cleaned.

Automatic solution make-up: During operation solution levels will be depleted through evaporation and/or carry-out. Each solution tank should be equipped with a method to add water automatically, without manual assistance. If left unattended, manually filled systems may run low causing the machine to shut down, which can possibly damage pumps and heaters. Manual water make-up systems should be avoided.

Low water protection: Every solution tank should be equipped with a device to sense a low water condition. If a low water condition occurs, pump(s) and heaters for that tank should automatically shut-off to prevent damage.

Short circuit protection disconnect: Electrical panels should have a fused or breaker type disconnect switch at the control cabinet to prevent entry while the power is "on" and for short circuit protection. Not all manufacturers include short circuit disconnect switches.

Safety

Canopy/access door sensor: A sensor should be provided for every access way into a spray zone to shut "off" the corresponding pump, should a door be opened or a canopy segment be removed. In addition, if a door is open or a canopy segment is off, the corresponding pump should be disabled, preventing the corresponding pump from being turned "on". This is an important safety device often overlooked by manufacturers.

Emergency stop buttons: One (1), mushroom head emergency stop push button should be placed at each end of the machine and one (1) on the control cabinet at a minimum. For optimum safety, emergency stop buttons should shut the entire cleaning system "off".