



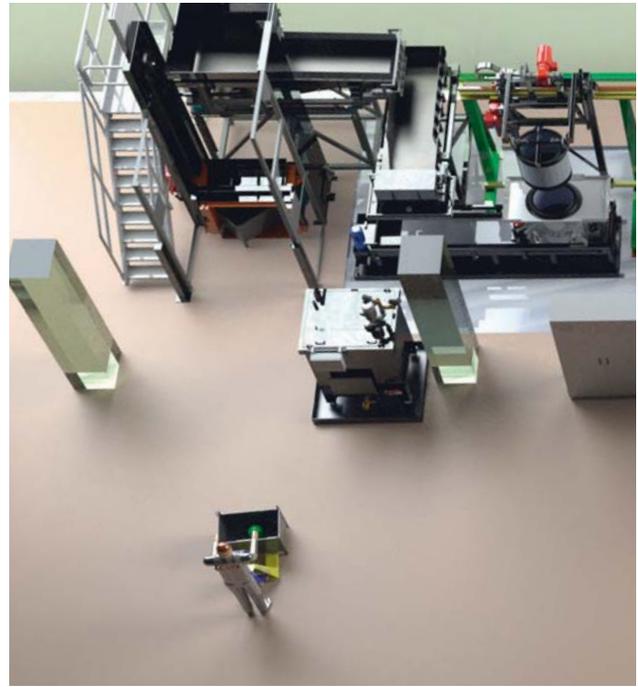
## **WMV Washing System**

always a winning combination



# WMV Washing Systems

are well-known for their cost effectiveness, flexibility, and environmental friendliness.



## 1.

### Charging station change to: Bin Dumper



■ *Lift-Tilt Device HKG 2000 with gentle flap*

WMV parts washing systems use centrifuge baskets to transfer the parts through the process. Bin dumpers and bulk loading systems load the baskets and can be integrated to virtually any process system. Loading systems have been engineered to gently load parts to washers, heat treatment lines, galvanizing lines, electroplating lines, coating lines and surface finishing lines to name a few. WMV offers different options to meet the customer's requirements for gentle handling and noise abatement for the movement of bulk material. These proven systems include:

- Clamps to lock an infinite array of bins and boxes into parts dumpers.
- Automatic diverter plates to reduce part fall.
- Discharging parts into solution for gentle loading and rinsing or treatment.
- Spiral chutes that lift vertically to greatly reduce part drops.

Precision weighing systems are used to ensure that continuous and batch loading are adapted to the geometry of the parts. Weight values can be controlled by recipes and program numbers.



## 2.

### De-oiling

A major advantage of the WMV washing system is the de-oiling of the parts preceding the washing process. By doing so, 92-95% of quench oils and lubricants are recovered. In many instances they can be returned directly to the production process provided the recovered oils meet their required quality standards. Removing up to 95% of the oil results in a large savings of water and cleaning chemistry. The service life of the detergent solution increases considerably. Optionally, the de-oiling centrifuges can be equipped with a hot-air blower, as thick and viscous flowing oils can be spun off more effectively in a heated state.

In the case of oil removal, our focus is again preventing part damage. As a standard, the centrifuges are equipped with infinitely variable speed control to avoid parts becoming bent or damaged. The centrifuge speed and de-oiling time are dependent on the geometry of the part. These parameters can be individually assigned to each part in a recipe or program.



■ De-oiling centrifuges without and with heating

### 3.



## Washing Process

After de-oiling the basket is transferred to the centrifuge washing module by a hoist. The basket is then tilted on an angle of up to 60 degrees. The basket starts to rotate, and cleaning detergent is continuously fed into the basket. After the cleaning process the basket is returned to the vertical position and spun at a high RPM to centrifuge off the wash solution and reduce drag out. The movement of parts in the basket provides the additional benefit of mechanical cleaning to the chemical cleaning of the parts. The rate of rotation and tilt angle establish the intensity of the mechanical portion of the cleaning process. For sensitive parts, process recipes with slow basket rotation and reduced tilt angles can be utilized to allow parts to gently roll over and around each other. Heavily soiled non-sensitive parts that are washed or dephosphated are processed with higher basket rotation and tilt angles to aggressively clean them. The washing process is recipe driven to allow all parts to use unique parameters to optimize the cleaning process and productivity.

Another WMV advantage is continuously feeding fresh detergent into the rotating basket during the entire washing process. This quickly moves solids and oils away from the parts being cleaned. The compromised solution is pumped to a solution tank specially designed to decant solids and allow oils to float to the surface. The floating oils are skimmed off using an adjustable overflow weir and discharged for additional treatment or disposal. The solids that settle to the bottom of the tank can be removed from the solution tank through oversized drainage lines located at the bottom of the tank. The refreshed detergent is reused and pumped back to the centrifuge washing modules.

An additional benefit of separating the detergent solution tank from the washing module is increased process flexibility. Multiple solution tanks can supply treatment solutions to the same washing module allowing the wash system to process parts with different chemicals without downtime or changeover. Since the last step of the washing process is centrifuging off the excess solution there is minimal drag out. The reduced drag out greatly reduces all costly resources such as water, waste water treatment, chemistry and solution maintenance.

# 4.

## Rinsing Process

After washing, the basket of parts is transferred to a rinsing module by a hoist. The rinsing process proceeds in the same way and with the same adjustment options as the washing process but with shorter treatment times. Most systems will have two rinses. Critical processes may require a third rinse. To reduce the use of fresh water and chemistry the rinses are counter flowed to provide make up solution to the 1st rinse and wash solution tank. After each rinse the basket is returned to the vertical position and spun at a high RPM to centrifuge off the rinse water and reduce drag out. Additional steps and components such as flushing and purging pipes or adding filters can be designed into the process.



■ Standard Tank Combination,  
Washing Tank – Oil Separator Tank – Rinsing Water Tank

## Chemical and Rinse Solution Tanks

*Year after year customers have confirmed that WMV washing systems are very low in water and chemical consumption. Due to de-oiling and centrifuging after or between the treatment steps the serviceable life of the solutions and chemistries used are greatly extended. To further reduce water and chemical usage the system cascades the rinses. Makeup water for the chemical solution tanks are pumped in from the corresponding first rinse solution tank. Makeup water for rinse solution tanks is also counter flowed by pumping rinse solution to 1st or 2nd rinse solution tanks from the later rinse solution tanks. If make up solution is not required to compensate for losses, contaminated solution can be pumped a wastewater treatment system or a holding tank for future treatment. Consistent high-quality cleaning is assured by adjusting the supply of fresh water and automatic or manual chemistry additions to maintain chemical concentration.*

*The oil-water mixture removed from solution tanks can be efficiently separated with the addition of a WMV oil separator designed and manufactured inhouse. After the separation process the de-oiled wash solution is pumped back to the wash solution tank as needed. Oil is discharged to a holding tank. In some cases, the oil can be refined and reused to further reduce costs*

*Standard solution tanks are heated electrically. Heating can also be accomplished using steam, gas burners or hot water if requested. Heat exchangers can also be used if the supplied heating media has sufficient thermal capacity to heat the solutions to the desired temperatures. The average temperature for the wash solution is between 60-80° C (140-175° F) and for the rinse water 40-60° C (104-140° F).*



■ Washing and Rinsing Plant



## 5.

### Drying

After rinsing, the basket of parts is transferred to a centrifuge dryer by a hoist. In most applications, the proven standard WMV AZ vertical drying centrifuge is used. If the parts are hollow, have recessed drives or are difficult to dry, a SZ tilting centrifuge is recommended to reorient and circulate the parts. During drying, the advantage of the WMV centrifuge system comes into effect again. The heat energy absorbed during washing and rinsing provides enough heat to allow centrifugal force to dry the parts quickly and effectively providing an energy savings. In the event additional energy is required to dry parts the machines are equipped with electric heaters, all of which are temperature controlled to minimize energy usage and preserve surface treatments. Tilting dryers that reorient and circulate parts can be equipped with humidity monitoring. In this case, the heating capacity is regulated according to the measured humidity. If the humidity no longer changes the parts are dry and the centrifuge will return to the home position even if the recipe time has not been reached. Thus, only the necessary heating energy is used to dry the parts. Even when drying, care is taken to protect the parts. As a standard, the centrifugal dryers are equipped with variable speed control to avoid bending or damaging longer or more sensitive parts. In the case of tilting centrifuge dryers, the speed, tilt angle and the number of tilt cycles are adjustable. The process parameters are tuned to the geometry of the part and used in process recipes that are assigned to a program or specific part.

## 6.

### Emptying

After the parts have completed the washing process they are discharged from the centrifuge basket using special standard tilting devices. Again, there are many options. The simplest solution discharges parts by tilting the basket 210 degrees allowing them to flow directly into customer containers. Many customers want to minimize part drops and handle parts as gently as possible to reduce part damage and preserve surface treatments. For these applications we can provide standard solutions that reduce part drops and gentle loading of bins.

If the system is integrated into a heat treatment line vibratory trays are used to meter a consistent quantity of parts onto the furnace belt or intermediate charging box. Parts are typically metered by weight and time. These or other parameters can be set in a part or program recipe.



■ Individual tilt devices



■ Centrifuge basket  
KAW700-650 in different  
versions

## Centrifuge basket

The heart of the wash system is the basket. It ensures optimal treatment of the parts and batch separation. The parts that are loaded to the basket are transported through the entire process in the same basket until it is emptied into the specified containers. Transporting the parts through the process in a basket ensures there is no mixing of parts during the process. Basket inspection by the operator between lots ensures it is free of foreign material before it is refilled. The basket is engineered for the range of parts being processed by specifying perforations, construction materials and baffle plates. In addition, the baskets can be engineered to handle (cassette baskets, box shaped baskets) for introducing special parts or tasks into the system.



■ Trolley in operation

## Transfer Hoist

The hoist is located on the framework tracks above the process modules and is responsible for the transport of the basket within the system. The hoist is program-controlled to efficiently move baskets to the individual treatment stations. Frequency-controlled motors provide speed control adapted to the cycle time. Positioning is monitored by an absolute encoder using a rack and pinion system to ensure precise positioning of the hoist. For higher outputs or long units, two or more hoists can be used in the system.

## WMV-Washing Units

are well-known as robust, economical and environmentally friendly machines for many decades.

*WMV systems are flexible, highly efficient and environmentally friendly. They are tailored to meet and exceed customer requirements for productivity and quality on a wide range of parts. Our top priorities are performance, reducing process costs, energy savings, environmental protection and flexibility. The modular system allows you to start small and expand as your processing requirements increase.*

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