



z-series | **ZD In-line Washer**

The ZD Series is our innovative response to the increasing diversity of parts requiring conveyor, chain, or fixtured in-line washing systems. Zippel through-feed cleaning machines can be custom-fit to any production line with fixed speed, variable speed, or indexing conveyor drives. Cycle time can be adjusted to the operations before and after the wash process to maximize productivity with minimal additional handling of parts.



Overview

Technical Process

- Multiple wash and rinse stations possible
- Automatic loading possible
- Noise insulation enclosure
- Programmable cycle timing
- Reverse conveyor drive
- Variable conveyor speeds
- Product carrier conveyor system adapted to parts

Optional Components

- In-line, overhead or U-shape conveyor
- Vacuum, infrared or hot air drying process
- Water treatment system
- Oil separator /centrifuge /vaporizer
- Cyclic operation
- High pressure cleaning
- Many types of automation possible for loading and unloading solutions

Advantages

- Easily accessible for maintenance
- Energy-saving due to double wall insulation
- Low servicing costs due to anti-twist snap closure on the nozzle line



Function

The parts to be cleaned are delivered to the tunnel cleaning machine either manually or by an automated system. The goods to be washed pass through the consecutive treatment zones either continuously or indexed cycles. Even integration into an existing conveyor system is possible. Also, special designs executed as so-called O or U type designs, where the loading and unloading positions do not have to be in line, are available upon customer request. Multiple line designs for increasing throughput rates or cleaning different types of component shapes are likewise available.

Available Treatment Options

- Cleaning and rinsing
- High-pressure cleaning
- Flake deburring
- Passivating
- Distributor-type injection water rinsing
- Cooling

During cleaning and rinsing, pressure is applied to the parts by spraying action. High-pressure cleaning is carried out by the high-pressure nozzles integrated in the high-pressure zone, where available. These nozzles are supplied by a high-pressure pump with just the right amount of pressure for each component.

Pressure is applied to the part in a precise manner and therefore ensures flake-free results after cleaning. Even purely mechanical treatments like brushing are possible (in the brushing zone). The cleaning media are heated to the required cleaning temperature, which is kept constant throughout the entire duration of the process, either by electrical heat (immersion heaters) or by technical heat using heat exchangers (hot water, thermal oil, gas heater, etc.).

Selection of the most suitable cleaning and drying method as well as of the most suitable handling system depends on the types of parts processed, the cycle times, the volumes to be cleaned, and their required final condition. Intermediate zones serving as neutral zones or blasting zones for the reduction of media carry-over are integrated in the system.

Additional treatment zones will be designed commensurate with customer requirements. All process media used in the machine are filtered and recycled into the system, with filtration fine-tuned to residual dirt requirements. After completion of the treatment, the workpieces are ready for pick-up and/or further transport. Unloading of the parts can be done either manually or by an automated system.

Nozzle System

A variety of different nozzle systems are used for application of the cleaning media. The system supports pressures ranging from low pressure to high pressure (up to 1,000 bar). The nozzle type and volume flow rate are configured and calculated during the design phase. To ensure optimum maintenance and manageable repair, we generally use nozzle clip systems and the nozzle fittings which are equipped with quick-release fasteners. High-pressure nozzles can also be used for flake deburring, if needed.

Tanks

The water necessary for machine operation is normally supplied directly from the customer's water supply mains and is controlled via filling level sensors. Replenishment of the water and cleaning agent is automatic. If several tanks are used simultaneously, water supply is available via cascade pumps at customer request. The media are returned from the process zones via a return line with integrated screen. All media tanks are made of stainless steel and heat-insulated.

Enclosure

The entire machine can be enclosed to reduce noise emissions. Large-surface doors will be integrated to ensure adequate accessibility for maintenance and inspection works.

Drying

There are a number of different systems available for part drying. Normally, side channel blowers or high-pressure fans are used for this purpose. These fans are designed specifically for the required volume flow rates and pressure rates and are adapted to the specified requirements. The air is applied to the parts either by a specially developed blasting pipe system (capillary system with air heating) and/ or blasting fan. Air heaters may be used to increase the temperature. Another available drying method involves the use of infrared rays to heat the parts and evaporate the residual moisture.

Closed Circuits

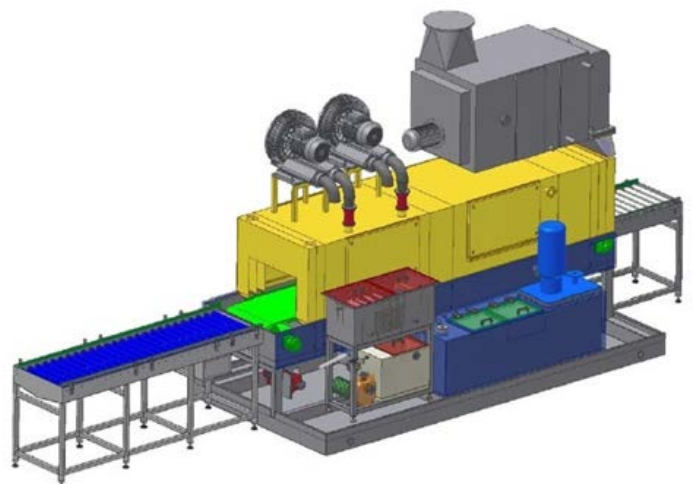
All media present in the machine are filtered and reintroduced into the circuit for an effluent-free machine operation.

Floor trough

An integrated floor trough is used to ensure collection of the fluids in case of tank leakage. In larger-sized machines, the floor trough is integrated in the machine's supporting frame. The floor trough is made of stainless steel and equipped with a leakage warning probe. The collecting volume is at least identical to the volume of the largest tank.

Bath Care

To achieve maximum service life for washing liquids, the washing media can be filtered in many ways. Coarse dirt is separated during a first phase while the medium is returned to the tank. Further residue is separated during full flow by an adequately designed fine-mesh filter. This process involves duplexed, double filter systems which can be switched over manually to allow filter changes during ongoing operation. This equipment is standard in every Zippel cleaning system. For special needs, additional bath care systems are available as full-flow or bypass systems, including e.g. screen inserts, band filters, swarf conveyors, solenoid separators, three-phase centrifuges, evaporators, osmosis systems, etc. For oil separation, we recommend our proprietary, highly-effective ECOSEP gravity oil separator which works through coalescing action. It separates the oil, passes it into a separate tank, and returns the cleaned water into the container. Even physical water treatment is possible with this system.



The increase in environmental protection requirements for industrial enterprises is the reason behind our search for environmentally-friendly methods for preventing air and water pollution. Over the last 40 years many of Zippel's innovations have been awarded prizes and have redefined standards for water and air treatment. Such inventions combine ecology with economy in an exemplary way since they minimize current costs for energy, waste and recycling.

Our systems usually operate within closed loop systems in all medium-conducting sectors. The closed loop does not channel wastewater out of the machine, rather it feeds it back in after it has been filtered. To lower the costs for disposal of solid waste and reduce its quantities, there is an option to filter the discharged waste further and discharge it as a concentrate. Zippel has been developing such optimized systems for filtering, exhaust air treatment and water treatment with its suppliers for years. Closed, segregated loop systems are the best way to lower operating costs such as chemical consumption, water consumption, energy consumption, and heating). In order to increase the efficiency of our machines, we attach great importance to energy-efficient planning and design of components used.

Environmentally Friendly Components

- BioJet: Hydrophysical water and fluid treatment to pre-vent and reduce the biological contamination of industrial water and process water
- AquaCorrect: Reduces the surface tension of process water and improves oxygen enrichment
- ECOSEP gravity oil separator: Reduced costs and longer service life due to permanent oil separation
- Water treatment plant
- ZUT vapor exhaust: Extraction and filtering of steam. Recycled fluids are returned to the plant
- Three-phase centrifuge
- Filtration and separation technology: custom-designed for the plant in compliance with the most stringent environment requirements; for improved production results
- Osmosis systems: Compact systems for the desalination of softened potable water
- Closed fluid and exhaust-air circuits



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Sample Technical Data for the ZD-6000-RAST

The ZD-6.000-RAST is an in-line cleaning machine. The parts are transported through the machine continuously and automatically by means of wire eye-belts while being sprayed with cleaning media from flat-jet nozzles and finally blasted with air. At the end of the machine, the dry parts are ready for handover to further transporting.

Machine specifications (circa values)

Length	Breadth	Height	Weight	Zones	Cycle Time
6,000 mm	2,900 mm	2,900 mm	5 t	8	15 sec/pcs

Temperature of Bath	Agent	Conveyor System	Sound Level
40 - 80 °C (100-175F)	neutral/alkaline	Twin-track	< 80 db(A)

Connections

Water intake	Compressed air	Electrical Connections
40 - 80 °C (100-175F)	neutral/alkaline	Twin-track

Cleaning Areas

neutral | cleaning | blowing | rinsing | drying

Cleaning

Tank Capacity	Pump	Filter
325 Gallon	100 GPM @ 60 PSI	50 - 200 µm

Rinsing

Tank Capacity	Pump	Filter
325 Gallon	70 GPM @ 40 PSI	15 - 50 µm

Blowing

Blowers		
400 ft ³ /min	200 mbar	7kW - 14 A