

## **'MULTIWASH' 3-BRUSH ROLLOVER VEHICLE WASH SYSTEM**

### **A. Manufacturer's Reference**

1. Specifications and drawings are based on a Westmatic *MULTIWASH* 3-Brush Wrap-Around Rollover System with overlapping side brushes manufactured by Westmatic Corporation (1-866-747-4567) or approved equal.
2. The system shall be produced by a manufacturer of established reputation with a minimum of five (5) years' experience supplying the specific equipment detailed herein.
3. The brush unit, pumping stations and all electrical controls shall be designed, assembled and supplied by one manufacturer.
4. A list of rollover vehicle wash system installations within the last five (5) years must be provided by the bidder. This list shall include the contact person at each location who is familiar with the operation and maintenance of the wash system. Based on the information supplied and discussions with contact persons named, the owner will determine the acceptability of the proposed supplier and the equipment.
5. Bidder must provide a list of factory authorized local service and technical support teams in the area.

### **B. General Description**

1. The *MULTIWASH* is a heavy-duty, three-brush rollover wash system capable of washing a high volume of various sizes and styles of vehicles.
2. The machine shall control the wash process to provide a consistent wash result without relying on the judgment of individual drivers.
3. The unit is to be manufactured according to quality assurance standards of **ISO 9001** and environmental standards of **ISO 14001**.
4. This system is capable of washing the front and rear of vehicles several times on a single wash pass and includes a special ***Automatic Mirror Protection Program***. The machine fully controls the degree of brush pressure on the vehicle and it automatically self-adjusts as required.
5. The wash functions of this system shall be operated automatically.
6. The system shall be delivered complete with all control systems, metering devices, drive motors, and brush assemblies.

### **C. Vehicle Wash Operation**

1. Vehicles entering the wash area will stop just before entering the rollover gantry. The driver is signaled to **STOP** by a red traffic light (Optional).
2. The driver selects the wash program on the main control box and starts the machine.
3. The brushes move into the front of the vehicle. The front area is cleaned by overlapping side brushes or the roof brush, or both depending on the selected wash program.

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4. Once the front cleaning function is complete, the brushes will withdraw and move automatically around the mirrors (***Automatic Mirror Protection Program***).
5. The machine now washes the sides and the roof of the vehicle.
6. The side brushes shall then move into the back of the vehicle, cleaning with overlapping side brushes or the roof brush, or both depending on selected wash program. Alternate program choices are available to accommodate different styles of vehicles within the fleet.
7. Once the rear has been cleaned, the machine rinses the vehicle and then returns to home position. The driver is signaled to **EXIT** the wash by a green traffic light (Optional).

### **D. Features/Performance/Construction**

#### **1. Brush Machine Housing**

- a) All frame and steel components shall be *hot dipped galvanized*. The frame structure of the gantry is to be enclosed with painted galvanized sheet metal and PVC splash guards. Each side of the gantry shall have a cabinet door, gaining access to machine components and controls. All gearboxes and motors are to be encased inside the machine for the highest quality of protection against water. Floor rails shall be *hot dipped galvanized* and equipped with derailing protection system. The gantry shall be direct driven via VFD-motors. (Variable Frequency Drive). *Chain drive is unacceptable*.
- b) All frame structures shall be hot dip galvanized. *Aluminum or Stainless Steel is unacceptable*.

#### **2. Brushes**

- a) The system shall be equipped with 2 vertical side brushes and 1 horizontal roof brush. The side brushes (1 & 2) shall be suspended and full length, capable of washing the vehicle's front if desired, as well as the rear of the vehicle multiple times with an overlapping movement. This set of brushes will also wash the vehicle's sides and shall be equipped with an ***Automated Mirror Avoidance Program***. This function shall be capable of multiple programs to accommodate various styles of vehicles that exist in the fleet presently, and any future styles that may be procured during the lifetime of the wash system. *Pneumatics is not acceptable to control the brushes*.
- b) Brush pressure is to be electrically driven, with the inclusion of an amperage meter for all brushes (1, 2 & 3), which is to constantly monitor pressure on the vehicle's surface. The movement of the overlapping side brushes is electrically controlled with motors and worm gearboxes via maintenance-free steel reinforced cog belts. *Via gravity alone, pneumatics or hydraulics are not acceptable*. The movement of the roof brush is electrically controlled with motors and worm gearboxes via maintenance-free cog belts. *Chains are not acceptable*.
- c) Should pressure become too high due to malfunction or driver error, the system shall automatically shut down to prevent damage. The cause of the shut down shall be indicated on an LCD Touch Screen within the control panel. Reactivation of the system shall be achieved by resetting the alarm/breaker switch.

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- d) Brush pressure is to be self-monitoring and self-adjusting to pre-programmed levels prior to the commencement of each wash.
- e) Bristles shall be polyethylene material that is "X" grooved to facilitate water and detergent delivery. The tips shall be flagged to provide soft touch to prevent scratching to glass and paint. Each brush section shall consist of a pliable plastic backing which is mounted to a 4-3/4" hot dip galvanized steel shaft with a wall thickness of 0.16 inch. *Aluminum is unacceptable.* The design shall be such that all sections for the side brushes shall be full density with a minimum of 84 tips per square inches on all brush sections. *Sections of less density brushes are not acceptable.*
- f) Brushes shall have a provision of water and detergent delivery. The mixture of detergent to the brushes shall be adjustable from the floor level allowing for adaptation to wash conditions. Piping shall be galvanized with brass spray tips.
- g) Brushes are to be driven by **High-Efficiency**, energy efficient and durable 3 HP, 3 phase, 60Hz TEFC electric motors.

### **3. Supply Cables and Cable Support**

- a) The festoon system shall consist of a C-profile with trolley wagons. All steel details shall be hot dipped galvanized including the brackets for fastening to the wall.

### **4. Detergent Injection Pump**

- a) The dosing pump for detergent distribution to the brushes shall be a self-priming diaphragm pump. The pump shall consist of:
  - 1) A cabinet incorporating the drive unit and the electronics.
  - 2) A dosing head with back plate, diaphragm valves, connections and vent valve.
  - 3) As the pump is always dosing at full stroke length, it ensures the same high accuracy and suction capability, irrespective of the capacity, which is infinitely variable in the ratio 1:100. The pump features a user friendly control panel which gives access to the pump functions.

### **5. Final Rinse Arch**

- a) The final rinse spray arch shall consist of a 3/4 inch galvanized pipe equipped with no less than 20 brass spray tips, mounted on a galvanized frame. *Components such as plastic tips, or PVC pipe, are not acceptable.*
- b) The system shall provide a complete rinse utilizing no more than 30 GPM @ 45 PSI.

### **6. Tire Guide Rails**

- a) The tire guide rails shall be flared at the entrance to facilitate entrance into the wash. The guide rails shall be constructed of 4-inch tubular steel pipe. Rail height is not to exceed 6 inches. All sections shall be smoothly finished to avoid damage to tires. Rails are to be anchored to the floor with 1/2 inch galvanized or non-corrosive concrete lag bolts. (10 feet on each side).

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- b) All components of the tire guide rails shall be hot dip galvanized steel.

### **7. Controls**

- a) The system shall be equipped with self-diagnostic software that indicates any errors, malfunctions, or other stoppages on a display screen. The nature of the shut down shall be displayed on the LCD Touch Screen mounted in the XBT-control panel. The terminal has three different color backgrounds depending on the status of the machine. Green for OPERATIONAL MODE, Orange for EMERGENCY STOP and Red for ALARM. The XBT terminal in the machines electric main control box adjusts the load sensitivity using power relays. The main control box with the control panel shall be mounted on the left hand side of the gantry.
- b) The system is to include a counter which displays the number of washes performed, both collectively and in various programs chosen. The system is to contain the capability to perform numerous unique wash programs for differing wash choices. Alternate wash selections can be activated by the driver on a control panel prior to commencing the wash. The M340 PLC-steering shall control and monitor the entire cleaning process.
- c) All electrical components and cabinet shall be UL/ULC listed. All control panels shall be UL/ULC listed as a complete enclosed industrial control panel.
- d) There shall be four emergency stop buttons, located on each corner of the machine including one on the main control box.
- e) The main control box shall include an XBT-control panel with a LCD Touch Screen to provide the following standard functions:

*Wash Program 1: Conventional School Bus*

*Wash Program 2: Transit Bus (Flat nose Bus)*

*Wash Program 3: Truck*

*Wash Program 4: Minivan*

*Wash Program 5: Car*

*Side Brushes On/Off*

*Roof Brush On/Off*

*Detergent Arch On/Off (Optional)*

*Start Wash Machine "Enter"*

*Reset Wash Machine*

*Roof Brush Up*

*Side Brushes Apart*

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*Manual Operation (Service Menu)*

*Drive-through Mode (Optional)*

*Master Menu*

*Emergency Stop*

*Emergency Stop Reset*

*The manual system shall be capable of over-riding the automated programmed selection.*

### **Warranty**

Equipment warranty will cover One (1) year commencing upon the date of the first wash. This warranty will cover the repair or replacement of equipment or material that causes any operational disturbances due to manufacturing defects or installation defects occurring within the stated 1 year period.

Ten (10) Year warranty on steel framework including galvanizing, welds and overall integrity.

### **Drawings/ Owner Manuals and Training**

1. **The supplier shall provide the following:**
  - a. As-built shop drawings of the system including electrical and plumbing drawings from client supplied connections in the wash bay.
  - b. Up to Three (3) owner's manuals – Hard copy and electronically.
  - c. On-site training:
    - Equipment Maintenance – Minimum 1 hour
    - Equipment Operation – Minimum 1 hour
    - Driver Operation – Minimum 1 shift

### **Utility Requirements**

#### **Water:**

1-1/2" cold water (60PSI) feed with *backflow protection* to mutually agreed service areas such as the pump room and wash bay.

#### **Electrical**

3-phase:           20amps @ 460/480 VAC or  
                          20amps @ 575/600 VAC (Canada)

1-phase:           10amps @ 110/120V for control & detergent injection pump.

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**Concrete pad**, center trench drain with grating, 6" overflow to oil/water separator and to sewer.

**For Optional Water Recycle System:** In-Ground Pits/Settling Tanks (can use oil/water separator for settling if it isolated for the bus wash and the size is large enough – ask Westmatic for details). In-Ground piping and conduit if applicable.

### **OPTIONS:**

#### **Drive-Through package for gantry system:**

- a. Drive-Through mode for high volume of vehicles
- b. Two (2) LED traffic lights
- c. Additional rinse arch, mounted on gantry
- d. Additional Wash programs: *With Front Wash*  
*Without Front Wash*  
*Sides Only*

#### **Pre-Soak / Detergent Arch**

- a. The pre-soak arch shall deliver approximately 4 gallons per minute at 45 PSI, to provide efficient and economical vehicle coverage.
- b. The spray pipes are manufactured of Stainless Steel. Spray tips shall be brass and equipped with quick disconnects. *PVC piping is unacceptable.*
- c. The pre-soak arch shall be designed in 3 parts, to provide complete coverage of the sides, front and rear. Each part is equipped with a brass solenoid valve to maximize effectiveness. To maximize efficiency and reduce chemical costs, spray to the front and rear of the vehicles shall only be applied when those portions of the vehicle are under the spray arch. The functions of start, stop, sprays for front, and back, shall be controlled infra-red sensors.
- d. Pump:
  - Stainless steel corrosion-resistant horizontal multi-stage centrifugal pump
  - Capacity 6.6GPM (25 liters/min) at 60 psi (4.0 bar)
  - Direct drive single-phase electric motor.
  - Carbon-type shaft seal
  - Relief valve of washer-type and bypass function included
  - Inlet filter
- e. Detergent Mixing System
  - 10G (40-liter) buffer tank for mixing detergent (pre-soak) with automatic mixing of concentrated detergent and water

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- Pre-determined mix of water and detergent automatically refilled through valve operated by a float
- Mixture can be changed for winter or summer conditions by changing the nozzle in suction hose of the detergent
- Equipment is delivered with a large number of color-coded nozzles, where each color represents a specific mixture
- To prevent separation of detergent from water when equipment is inactive, the equipment is delivered with a bypass-type mixture device from pump to tank
- Detergent pump is placed on a galvanized floor stand under the buffer tank

#### **High Pressure Arch**

**(Recommended to augment washing odd shaped vehicles)**

- a. Designed with optimized high-pressure spray pattern to clean the fronts of vehicles and augment washing on front, sides and rear of odd shaped vehicles.
- b. Galvanized steel high-pressure pipe (one each side). Minimum 12 stainless steel spray nozzles.
- c. The High-Pressure Pump shall be a multi-stage vertical stainless steel centrifugal type with a 25hp direct-drive, direct-start motor. Capacity 92GPM (350 liters/min) at 285psi (20 bar). All vital parts are polished stainless steel SIS 2333. Pump is delivered with all connector hoses.
- d. Buffer tank 400G (1500 liters), manufactured in plastic with automatic refill and level control. Includes suction and bypass connections, shut-off valves and low water level pump protection.
- e. Electrical Power Requirements (3-phase):  
40amps @ 460/480 VAC or  
40amps @ 575/600 VAC (Canada) or  
80amps @ 208/230 VAC
- f. **Optional:** Rotating Pipes for more accurate, efficient application.

#### **Chassis Wash (city water pressure)**

- a. Designed with optimized spray pattern to clean the vehicle under body.
- b. Water is fed from the brush module. Shall include a manual gate valve for summer shut-off.
- c. Galvanized steel pipe (minimum 9'-2" in length) mounted perpendicular to vehicle travel direction. Minimum 8 stainless steel spray nozzles. Total water volume approximately 12gpm.

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- d. Includes hot dip galvanized steel cover plate grate (traffic rated) with cut-outs for pipe connections.

#### **High-Pressure Chassis Wash**

- a. Designed with optimized high-pressure spray pattern to clean the vehicle under body.
- b. Galvanized steel high-pressure pipe (minimum 9'-2" in length) mounted perpendicular to vehicle travel direction. Minimum 8 stainless steel spray nozzles.
- c. Includes hot dip galvanized steel cover plate grate (traffic rated) with cut-outs for pipe connections.
- d. The High-Pressure Pump shall be a multi-stage vertical stainless steel centrifugal type with a 25hp direct-drive, direct-start motor. Capacity 92GPM (350 liters/min) at 285psi (20 bar). All vital parts are polished stainless steel SIS 2333. Pump is delivered with all connector hoses.
- e. Buffer tank 400G (1500 liters), manufactured in plastic with automatic refill and level control. Includes suction and bypass connections, shut-off valves and low water level pump protection.
- f. Electrical Power Requirements (3-phase):
  - 40amps @ 460/480 VAC or
  - 40amps @ 575/600 VAC (Canada) or
  - 80amps @ 208/230 VAC

#### **High-Pressure Wheel Wash**

- a. Designed with optimized high-pressure spray pattern to clean the vehicle wheels, rims and rocker panels.
- b. Galvanized steel high-pressure pipe (one each side). Minimum 12 stainless steel spray nozzles.
- c. The High-Pressure Pump shall be a multi-stage vertical stainless steel centrifugal type with a 25hp direct-drive, direct-start motor. Capacity 92GPM (350 liters/min) at 285psi (20 bar). All vital parts are polished stainless steel SIS 2333. Pump is delivered with all connector hoses.
- d. Buffer tank 400G (1500 liters), manufactured in plastic with automatic refill and level control. Includes suction and bypass connections, shut-off valves and low water level pump protection.
- e. Electrical Power Requirements (3-phase):
  - 40amps @ 460/480 VAC or
  - 40amps @ 575/600 VAC (Canada) or
  - 80amps @ 208/230 VAC



## ***'MULTIWASH' 3-BRUSH ROLLOVER VEHICLE WASH SYSTEM***

### **Dryer / Blower System**

- a. Hot Dip Galvanized 4" X 4" square steel tubing framework.
- b. Standard Clearance: 14' High x 9' Wide
- c. Producers (plastic) Width 28", Height 32-1/2", Depth 29", Nozzle Opening 5" x 10",
- d. 5400CFM, Air Velocity 165MPH
- e. Motors: Each 15HP, TEFC, 3510RPM, 215 FRAME, 15HP
- f. Five (5) Fan/Motor Assemblies (2 on each side, 1 on top). 75HP Total.
- g. Electrical Power Requirements (3-phase): 125amps @ 460/480 VAC or  
125amps @ 575/600 VAC (Canada) or  
250amps @ 208/230 VAC

**Optional:** Oscillating Top Fan in lieu of fixed.

### **Skid plates**

- a. Stainless steel skid plates assist with guiding the vehicle into the entrance of the tire guide rails. Attached to the floor at with ¼" stainless steel anchor bolts.

### **Automatic final rinse water booster system (Recommended when city water pressure is under 60 psi)**

- a. Buffer tank 160G (600 liters), manufactured in plastic with automatic refill and level control.
- b. Pump shall be a multi-stage vertical stainless steel centrifugal type with a 3hp direct drive motor. Capacity 44GPM (165 liters/min) at 71psi (5.0 bar). All vital parts are polished stainless steel SIS 2333. Pump is delivered with all connectors.
- c. Electrical Power Requirements (3-phase): 5amps @ 460/480 VAC or  
5amps @ 575/600 VAC (Canada) or  
10amps @ 208/230 VAC

### **Ethernet Module**

- a. An Ethernet module is available to enable contact between the machine's PLC and the factory for remote diagnostics and off-site program adjustments (network/ internet access required).

### **Water Recycling System with Ozone Generator, WWR-165 (40GPM)**

**(Note: This option is for the basic brush system without high-pressure. If a high-pressure option is used then only Model WWR-300 system is needed – see next item below.)**

- a. To achieve highest economical level of water recycling without the use of any chemical additives.
- b. Recycling of approximately 85% of used water.
- c. Stainless Steel hydro-cyclones as mechanical purifying unit.

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- a. Purification level down to particle size 10 microns density 2 with dirt load of 1 g/liter.
- b. Fresh water cross-over shall be included (in case of disrupted operation).
- c. Submersible pump, 1/2HP, for recycled water, is mounted in ground tank / pit.
- d. Two (2) Multi-stage vertical stainless steel centrifugal pumps are included (one filter pump and one wash water feed pump). Each with a 3hp direct drive motor. Capacity of each pump is 44GPM (165 liters/min) at 71psi (5.0 bar). All vital parts are polished stainless steel SIS 2333.
- e. All pumps are designed for dirty water with oil resistant gaskets and ceramic seals.
- f. Buffer tank 137G (520 liters), manufactured in plastic with automatic refill and level control. Includes low water level pump protection.
- g. Hot dipped galvanized framework. System is skid mounted, pre-wired and pre-plumbed.
- h. System includes an **Ozone generator** for removal of bacteria and odors in recycled water. Completely automatic function producing approximately 5 gr ozone/hour.
- i. Electrical Power Requirements:
  - 3-Phase: 15amps @ 460/480 VAC
  - 15amps @ 575/600 VAC (Canada) or
  - 30amps @ 208/230 VAC
  - 1-Phase: 15amps @ 110/120V for Ozone Generator

### **Water Recycling System with Ozone Generator, WWR-300 (80GPM)**

(Option for high-pressure system)

- a. To achieve highest economical level of water recycling without the use of any chemical additives.
- b. Recycling of approximately 85% of used water.
- c. Stainless Steel hydro-cyclones as mechanical purifying unit.
- d. Purification level down to particle size 10 microns density 2 with dirt load of 1 g/liter.
- e. Fresh water cross-over shall be included (in case of disrupted operation).
- f. Submersible pump, 3/4HP, for recycled water, is mounted in ground tank / pit.
- g. Multi-stage vertical stainless steel centrifugal type filter pump with a 5hp direct drive motor. Capacity 72GPM (275 liters/min) at 71psi (5.0 bar). All vital parts are polished stainless steel SIS 2333. Pump is delivered with all connectors.
- h. All pumps are designed for dirty water with oil resistant gaskets and ceramic seals.
- i. Hot dipped galvanized framework
- j. System includes an **Ozone generator** for removal of bacteria and odors in recycled water. Completely automatic function producing approximately 5 gr ozone/hour.

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k. Electrical Power Requirements:

3-Phase: 15amps @ 460/480 VAC or  
15amps @ 575/600 VAC (Canada) or  
30amps @ 208/230 VAC

1-Phase: 15amps @ 110/120V for Ozone Generator

**Optional: Brush Recycled Water Feed Pump:** Multi-stage vertical stainless steel centrifugal type with a 3hp direct drive motor. Capacity 44GPM (165 liters/min) at 71psi (5.0 bar). All vital parts are polished stainless steel SIS 2333. Pump is delivered with all connectors. Electrical Power Requirements (3-Phase):

5amps @ 460/480 VAC or  
5amps @ 575/600 VAC (Canada) or  
10amps @ 208/230 VAC

### **Water Discharge Purification, RENAREN (The Purifier)**

(Water purification system which fulfills the highest environmental demands. Only required by some local jurisdictions. This system provides water treatment to used dirty water prior to discharge to sewer)

### **Description of function**

Electro flocculation is a method using symbiosis between electro flotation and electro precipitation.

Water is pumped into the electro flocculation unit and runs between an anode and a cathode. The cathode is made of stainless steel while the anode material can vary depending on application.

During electrolysis, water is reduced either to H<sub>2</sub> (g) and/or oxidizes to O<sub>2</sub> (g). This generates fine gas bubbles (approximately 20 µm). These gas bubbles slowly rise to the surface and collide with emulsified or dispartaged impurities such as oil, heavy metals in water phase and forms a flocking which is separated. Up to 80% can be separated by this method. To separate the remaining 20%, a special reactor-anode must be used. When Al is used, Al<sup>3+</sup> is freed from the anode and the remaining impurities are either separated by precipitation or as Al (OH)<sub>3</sub> substrate.

Waste products are collected in a deposit chamber that will be emptied by a vacuum truck with suitable intervals.

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This solution means that you don't have to manage any waste from the Renaren manually. Voltage and amperage controls the electrolyte reaction. It is important that power consumption and AL-consumption is optimal for each installation to gain as low running cost as possible. The anode is rotating during the process. The whole process is monitored and controlled via a PLC-system to reach optimal conductivity and optimal capacity from the rectifier.

Dosage equipment for increasing of conductivity includes 53 gallon tank, agitator and dosage pump.

There is no extra cost for water purification for water from work shop or other building areas.

**Please note:** Renaren should be installed after oil separator and will purify contaminated water from work shop and grease pit etc.

Electrical Power Requirements: 3-Phase: 20amps @ 460/480 VAC  
1-Phase: 15amps @ 110/120V.

(See brochure and flow chart 302-W4 for more information)

**Please Note: For more options please contact the manufacturer.**