

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A) Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A) This Section includes the vehicle wheelwashing system and equipment and accessories, including:
 1. Wheelwashing platform elements with spray nozzles and piping.
 2. Splash walls and side spray piping nozzle assemblies
 3. Wheelwashing pumps (2 required).
 4. Controls for wheelwashing system, including vehicle entrance sensor.
 5. 2,900 Gallon Water Recycling with Automatic Scraper Conveyor Solids Removal Tank System
 6. Automatic Flocculent dosing system.

1.3 WHEELWASHING SYSTEM DESCRIPTION

- A) Furnish a completely automatic, modular, touchless drive-through wheelwashing and water reclamation (dirt sediment settlement and water recirculation) system for mobile and/or permanent applications, suitable for vehicles having weights and dimensions allowed on public roads. With the systems common components Six alternative systems may be configured.

1.4 PERFORMANCE REQUIREMENTS

- A) Operation: As the vehicle approaches the wheelwashing unit the wash cycle and related water recycling operations shall be automatically activated by the vehicle passing through the entrance sensor. Length of the continuous wash platform must allow for greater than 13 ft drive through length. A technically coordinated spray system creates an effective washing result for the complete length of the vehicle as the vehicle is driven in a fixed path between tire guides at a slow speed (30-40 feet per minute) through the wash platform. The angled profile construction of the continuous wash platform base areas flexes open the tire profiles and therefore supplements the cleaning effect.
 1. A specially developed nozzle characteristic including side and bottom nozzles ensures for an efficient water spray profile for targeted cleaning of the tire profiles, outer and inner wheel surfaces and part of the chassis. The bottom nozzle angles are no more than 20 degrees so arranged that the vehicle driver's sight is not impaired during the wash cycle and that only a minimum of over spray is transferred into the surrounding area.

2. The length of the wash cycle is dependent on operating conditions and is progressively adjustable via a timer located on the front of the control cabinet.
3. The wheelwashing system shall also be equipped with an adjustable timed shut off which stops the system after the set time has elapsed after the vehicle enters the system, to allow drivers of stopped or stalled vehicles to exit the vehicle after the wash system stops.
4. As the vehicle is driven through the wheelwash at 30-40 feet per minute, the wheelwashing system shall satisfactorily remove all visible, heavy dirt accumulation from the vehicle's tires and tire-grooves and wheel wells, to prevent track-out of dirt by a truck's tires out of the owner's premises.

PERFORMANCE REQUIREMENTS continued

- B) Minimum design capacity in vehicle wash cycles per hour shall be up to 60 at a 1-minute wash cycle.
- C) The supplier is solely responsible for the equipment performance. Should the equipment not perform, as per these specification requirements, the supplier shall modify, add and/or alter the equipment supplied at his own expense until the performance is satisfactory.
- D) The water reclamation system shall be capable of reclaiming water from the wheelwashing system and process the removal of suspended dirt by means of a settling tank. The submersible slurry pumps then reuse the water in the wheelwashing system.
 1. The wash platform wash elements shall be of boxed construction, with integrated, internal sludge / water drainage slopes minimum 2% via which the sludge and dirty water is diverted to centered 23 inch wide openings .
 2. The wheelwashing system is also equipped with a 5000 gallons recycling tank of self-supporting steel construction consisting of a steel 4 mm thickness, ST 37 profile frame and plate. The tank in an empty condition is also capable of withstanding the ground pressures and forces resulting from a passing by, fully loaded truck. External dimensions:197 in l x 87 in w x 75in h, Useful volume: 5000 gallons, weight: ca. 4,200 lbs
 3. The recycling tanks shall be equipped with a continually operating single scraper-conveyor module to evacuate and dewater solids, the scraper conveyor chain/plate assy shall be mounted on dual rails and guide ways with 6 specialty designed sprockets and 3 shaft assemblies and 6 auto lubricating 30 mm diameter bearing. The linked chain length shall be of 16.4' with 10 collection plates 8.5 cm high attached 3 points with a dirt removal scraper conveyor discharge 70.5 " height. The conveyor assemblies are driven by a .33 hp Nord motor and gear reducer. The module consists of 3 sections is removable and may be retrofitted in ConLine series tanks.
 4. The wheelwash system's slurry quality pumps are to be placed in the pump chamber of the in- ground 5000 gallon water recycling and sedimentation collection tank. The pumps will be capable to pump abrasive slurries without compressors or filters, other than the integrated pump screens, to filter the reclaimed water. The pump and integrated screen system are to be designed to not allow the passing of larger than ¼ inch solids to the wheelwash platform.
 5. The wash pumps are to be designed for maximum cleaning effectiveness flow and pressure at 49 ft to 72 ft of head.
 6. The pump is to be designed for a complete mechanical rebuild cost of components under \$790 USD.
 7. Water delivery from the pump chamber to the wheelwash platform shall be via two pumps and one direct 4 inch id supply line to provide for an efficient pressurized water spray profile at the wheelwash platform. The water delivery system will be capable to pump wash water without headers.

8. The settled-out sediment in the recycling chambers shall be removed at regular intervals, the time period for which being dependent on how often the system is used.
9. The system shall have an Automatic Flocculent dosing system to increase and optimize the sedimentation process. The flocculent is fed via automatic dosing unit volume delivery at 50 liters per hour.
10. The system must be able to continuously supply adequate amount of water for the wheelwash pumps regardless of traffic volume (subject to 1.4 B).
11. Prior to final acceptance of the system by the owner, the supplier shall demonstrate the continuous operating capacity of the reclamation system in relation to the wheelwashing system.

1.5 SUBMITTALS

A) Product Data:

1. Submit Product Data in strict accordance with requirements of these specifications and the General Requirements.
2. Submit the below listed technical information, concept design drawings and layouts for the Engineer. The quality of these drawings shall be such that the Engineer shall be able to determine and make changes required to related civil construction, electrical and mechanical work and installation work shown in the Contract Documents to accommodate the system supplier's proposed system. The set of drawings submitted shall consist of, but not be limited to, the following:
 - a. CAD Equipment general layout longitudinal section.
 - b. CAD Equipment general layout side view.
 - c. CAD Equipment general layout cross-section.
 - d. CAD Wheelwashing and Water discharge drawings.
 - e. Detailed listing of pumps, valves and other components used within the system and operation and maintenance data and instructions.

B) Operation and Maintenance Data: For Wheelwashing System to include emergency, operation, and maintenance manuals.

C) Warranties: Special warranties specified in this Section.

1.6 QUALITY ASSURANCE

- A) The wheel wash system, pumping equipment and all electrical controls shall be designed and supplied by one supplier.
- B) Supplier shall have been regularly engaged in the engineering, manufacturing and supply of the wheelwash systems for a period of not less than Twenty five years and a minimum of 2000 wheelwash systems installed and operating. All similar items shall be the products of one manufacturer. The equipment offered shall be the latest standard product, modified as necessary

to meet conditions of the project.

- C) Product Options: Drawings indicate size, profiles, and dimensional requirements of the named supplier listed in the Products section of this specification and are based on the specific systems indicated.
- D) The equipment specified herein shall be MobyDick Wheelwashing Systems ConLine Series manufactured by Frutiger Company AG.

1.7 DELIVERY, STORAGE, AND HANDLING

- A) Deliver, store received materials at project site or other contractor-controlled location and handle delivered materials in accordance with system supplier's instructions.

1.8 COORDINATION

- A) Coordinate layout and installation of wheelwashing system and components and with other construction shown on the drawings.
- B) Coordinate size and location of concrete with the project Structural Engineering firm qualified to provide concrete specifications. Concrete, reinforcement, and formwork requirements are specified in Division 3 by the project-engineering firm.

1.9 WARRANTY

- A) Special Warranty: Warranty on the Wheelwashing system components and accessories supplied by the system supplier, in which system supplier agrees to repair or replace components that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1. Operation: noisy, rough or substandard operation of system or individual system components.
 - 2. Parts: loose, damaged or missing parts.
 - 3. Finish: Abnormal deterioration.
 - 4. System effectiveness: dirt removal from vehicle's tires.
- B) Warranty Period: Two years from date of Substantial Completion for Items A. 1. through 4 above.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A) Manufacturers: Subject to compliance with requirements, provide products by the following:

1. The equipment specified herein shall be MobyDick ConLine Wheelwashing Systems manufactured by Frutiger Company AG.
- 2.

2.2 WHEELWASHING SYSTEM

A) Description:

1. Furnish and supervise the installation of an integrated wheelwashing system consisting of two each, one-piece continuous wash elements with internal water carrying channels; integrated 2-tier tire guides, modular polymer splash walls, quick coupler removal and directionally adjustable 2 tier PVC side spray bar assemblies with integrated nozzles; with pumps, check valves and piping; controls and accessories, one recycling tank 5000 gallons of self-supporting steel construction with continually operating single scraper-conveyor module to evacuate and dewater solids as shown on the drawings. The wheelwash system shall operate automatically through the entry controls. Overall dimensions, with a drive-through track width of 110 inches are (157.5 inches x 305 inches x 68 inches) and weight of ca 12,400 lbs.
2. The wheelwash water spray pattern shall not extend above the 53-inch height spray walls supplied such that wind drift of the water spray will not carry beyond the spray walls and drainage sumps when no vehicle is present on the wheelwash platform.

B) **Wheelwashing System**

1. Wheelwash elements shall be a minimum of two hot-dip galvanized wash elements (left/right) each 157.5" long x 37" wide x 15.5" high to allow for ground-level access after on-site matching of the road to the entry and exit areas. The wash elements have an integrated, internal sludge/water drainage slope and are a self-supporting robust steel construction consisting of internal hot dipped galvanized water-carrying channel sections and surface angled profiles, designed to take a maximum axle load of 33,069 lbs.
2. Overall dimensions, with a drive-through track width of 110 inches are (157.5 inches x 305 inches x 68 inches).

C) **Wheelwashing System continued:**

1. The hot dipped galvanized metal center spacer/water diverter system shall establish the drive through track width of 110 inches and consist of two spacer plates and three middle elements with sloping sides constructed from galvanized checker plate.

2. The Wheelwash element system for complete washing of the tire profiles, outer and inner wheel surfaces and part of the chassis is constructed such that the static spray nozzle manifolds consisting of 130 nozzles of 7 mm diameter are integral with the wheelwash platform structure and such that the truck tires drive over the spray manifold assemblies. The truck tires must roll on and contact the spray nozzle manifolds with all nozzles being protected.
3. The Wheelwash elements on which the tires ride shall be constructed of water carrying triangular tubes and angle iron at right angles to the tire travel with angle aligned upward to flex the tires as the vehicle traverses the platform with specially developed nozzle characteristic including side (18 degree spray angle) and bottom (15 degree spray angle) nozzles ensures for an efficient pressurized water spray profile for targeted cleaning of the tire profiles, outer and inner wheel surfaces and part of the chassis in order to maximize the discharge of dirt from between the tire grooves while being sprayed by the wheelwash system.
4. The wheelwash elements shall be designed with integrated two tier galvanized tire guides. The integrated tire guides shall be (11.8 inches high) each shall consist of two levels of (3.9 wide x 5.9" high) tubular constructed steel 5 mm thick.
5. The wheelwash elements load carrying capability of the triangular tubes shall be a minimum of 33,069 lbs.
6. The wheelwash system shall have a minimum of 2 submersible sludge quality pumps with integrated screen assemblies, check valves and clean water well piping, the pump being a minimum of 7.4 hp (480 V,60 Hz) and able to deliver individually a maximum of 237.5 gallons per 30 second wash cycle . At 49 ft to 72 ft of head, the pump is capable of operating with a flow of 475 GPM and approximately 22-psi lower wash element nozzle pressure with a completely filled water system.
7. The pumps are to be designed for a complete mechanical rebuild cost of components under \$790 USD.
8. Water delivery from the pump chamber to the wheelwash platform shall be via two pumps and one direct 4 inch id supply line, fixed with cam and lock fittings, to provide for an efficient pressurized water spray profile at the wheelwash platform. The water delivery system will be capable to pump wash water without headers.
9. The continuous wash platform elements of 157.5 inches with integrated static and sidewall spray nozzles assemblies shall cover a distance longer than an entire width and circumference of an R2400 rotating tire when traversing the wheelwash platform.
10. The wheelwash system must be equipped on both sides with 2 sections of molded polymer splash walls that shall run the full length of the wheelwash platform. The splash walls will be constructed as four panels. Each splash wall panel section shall be 78 3/4 in long x 53 inch high and 1.9" thick and will be slid into 3 support bracket assemblies and fixed without use of nuts, bolts or screws. The splash wall panels shall be movable by one man.

B) Wheelwashing System continued:

1. The wheelwash system shall have two sets of two tier PVC side spray bar assemblies. Each spray wall assembly shall have 2 inch diameter schedule 40 PVC pipe, color grey with nozzle systems consisting of a total 17 integrated 6mm side spray nozzles, top tier nozzles at 30 degree angle, lower tier nozzles at 20 degree angle. The spray bar assemblies are removal and attached to the wash element platforms with cam and lock fittings. Each spray bar assemblies are modular with three subassemblies. The spray bar

assemblies shall have threaded couplers that allow the spray bars to be rotated to allow for field adjustable spray angle changes. The spray bar assemblies shall run the full length of the wheelwash platform.

2. The wheelwashing system must be capable of emptying the continuous wash platform elements and side compartments of wash water effluent back into the recycling tank within 60 minutes of its last use to prevent water freezing in the wheelwash system during the winter periods.
3. The system shall include a total of 5,000 gallons serving as water recycling; solids collection chambers and a pump compartment. There will be one 5000 gallon tank; fabricated of self-supporting steel construction consisting of a steel 4 mm thickness, ST 37 profile frame and plate. The tank in an empty condition is also capable of withstanding the ground pressures and forces resulting from a passing by, fully loaded truck. All construction parts are chemically pre-treated, prepared with a special primer and finished in RAL-Color 6029 Green. The water level in the tank will be controlled by automatic level control. The 5,000 gallon tank shall have a 2 piece weir assembly with lift eyes. The 2 pieces shall interlock to form a complete weir. The tank's external dimensions: 228 in l x 87 in w x 57 in h, Useful volume: 5000 gallons, weight: ca. 4,200 lbs
4. The recycling tank shall be equipped with a continually operating single scraper-conveyor module to evacuate and dewater solids, the scraper conveyor chain/plate assy shall be mounted on dual rails and guide ways with 6 specialty designed sprockets and 3 shaft assemblies and 6 auto lubricating 30 mm diameter bearing. The linked chain length shall be of 16.4' with 10 collection plates 8.5 cm high attached 3 points with a dirt removal scraper conveyor discharge 70.5 " height. The conveyor assemblies are driven by a .33 hp Nord motor and gear reducer. The module consists of 3 sections is removable and may be retrofitted in ConLine series tanks.
5. The recycling tank shall include height extensions 20 inches, fabricated as panels in varying lengths from ST37, 4 mm thickness, profile frame and plate ,inner and outer surfaces primed and finished with a top coat . The extension panels shall be movable by one man.
6. The wheelwashing system is also equipped with recycling tank safety railing , constructed out of square steel profile, hot dipped galvanized, height, with toe, center and top railing : 40 inches high and includes an access ladder of square steel profile, hot dipped galvanized.
7. The wheelwashing system is also equipped with an electro-mechanical flocculent dosing pump with oil-lubrication and diaphragm dosing head. The flocculent dosage sized at 50liters per hour is regulated via a hand-wheel and time relay for infinite variation of the feed-amount. The flocculent is pumped directly from the original container and evenly fed into the water-system where it is optimally mixed, thus ensuring good sludge-settlement. The dosing unit can be mounted onto the wheel-washing unit and is complete with a protective hood, Connected load: 1/6 hp. 3 phase , 60 Hz , 480 v
8. The system shall be designed to convert into a total of 6 wheelwash system designs consisting of completely in-ground or surface mounted systems, with or without scraper conveyor automatic solids collection/removal and scalable to a 2 tire revolution platform length with the addition of Frutiger Company MobyDick Conline system components.

C) Electric Control Panels and Components:

1. Stainless Steel Control enclosure panel with complete electrical system with Allen Bradley components with Standard UL 508A and ULC certification. Control panels shall be

designed for operation on a 440/480/ Volt, 3 phases, 60-Hertz system, and shall be of a central open loop design. Control panels that are not UL/ULC certified are not acceptable.

2. System power is 15.3 hp, 480v, 3pH, and approximately 23.4 Amps operating.
3. System activation and stoppage switches shall consist of one IP 67 data sensors
4. The sensor will be placed in a self-supporting hot dipped galvanized stand .The sensor stand head housing shall have an integrated rotation plate to provide for sensor focus directional changes in the field.

PART 3 – EXECUTION

3.1 EXAMINATION

- A)** Examine site and project conditions for compliance with requirements for, installation tolerances, and other conditions affecting performance.
- B)** Examine roughing-in for process water and potable piping systems to verify actual locations of piping connections before equipment installation.
- C)** Proceed with installation only after unsatisfactory conditions have been corrected.
- D)** Electric Control Panels and Components:
 - 1.** Control panels shall be designed for operation on a 440/480 Volt, 3 phase, 60 Hertz system, with a short circuit capacity of 25,000 amperes RMS symmetrical available at the incoming line terminals of the control panel.
 - 2.** System activation sensor shall be designed to be activated by all fleet vehicles used by the owner.

3.2 WHEELWASHING SYSTEM INSTALLATION

- A)** Install equipment in accordance with manufacturers' supplied assembly drawings.
- B)** Equipment supplier shall undertake the commissioning of the system and make all required adjustments to ensure proper operation.
- C)** The equipment manufacturer's representative shall start-up the system. The owner will have operating personnel present during the start-up and equipment training.
- D)** The owner's personnel shall be trained for a minimum of 5 hours in the system assembly, operation and maintenance.
- E)** The supplier shall provide the owner the names and the addresses of all factory-authorized regional service and maintenance personnel to assist in future service.

3.3 CLEANING

- A) Clean the wheelwashing system and components after startup and testing and before final acceptance by Owner.
- B) After completing system installation, including outlet fitting and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finishes.

PART 4 OPTIONAL ITEMS

SPECIALTY CLEANING SYSTEMS

1. Hand Wash for manual periodical cleaning down of the Wheelwashing unit and/or cleaning of other vehicles and equipment within the wash area. The wheelwashing system is also equipped with a manual hand wash system that will contain a manual cleaning facility consisting of a Sliding, 2-way valve with ca. 50 feet of hose and fire type end control nozzle, separate pump control on control cabinet.
2. Undercarriage Wash for supplemental cleaning of vehicle undercarriage area: The wheelwashing system is also equipped with an undercarriage wash with nozzles that span the distance between the inside edges of the vehicles tires. The undercarriage wash is activated as the vehicle passes over a sensor placed prior to the entrance to the wash. The undercarriage wash shall have a minimum additional pump delivering 475 gpm flows as its water supply. An undercarriage static spray nozzle manifold will consist of 20 each 6 mm diameter nozzles at 90 degrees delivering 20-25 psi outlet nozzle pressure. The Wheelwash undercarriage wash shall be constructed of steel integrated with the water delivery wash platform elements .The undercarriage washing system must be capable of self-emptying wash water effluent back into the settlement tank within one hour of its last use to prevent water freezing in the wheelwash system during the winter periods.
3. Exit Area Back Wash for automatic cleaning of exit pad area: The wheelwashing system is also equipped with an exit area back wash system that will contain an exit area automatic wash system for keeping clean the exit area of the unit, consisting of 2 spray pipes each ca. 10 feet long with 5 adjustable nozzles, located on both sides of the exit area and connected via piping to the wheel-washing unit side spray wall assemblies.

RUMBLE STRIP , DRIP PAD, RAMPS

1. Rumble Strip Pads for vehicle speed reduction and passive cleaning of the sediment from the tires: The wheelwashing system is also equipped with Rumble strip assemblies for entrance and an exit areas, each assembly will be 12 ft long x 118 inches wide, hot dipped galvanized, 2x angle iron tire installed as a chevron design with centered water flow collection channel optimally mounted on a ½ inch steel plate with 4 lifting eyelets for locating chains or straps for placement.

2. Exit Area Drip Rack System for automatic collection and return of wash water “ walking off “ with vehicles from the wash platform : The wheelwashing system is also equipped with an exit area drip rack system, 13 ft long x 118 inch wide x15 inch high, hot dipped galvanized , 2x angle iron tire flex boxed tire elements, with integrated 2 % slope , tire guides , flush nozzles, mechanical control valve , center span water diversion plates and an integrated return wash water channel 13 ft long. The system offers for flushing a dedicated 475 gpm Moby Pump and 4 inch piping ,brackets, connections -Moby Pump to Drip Rack System
3. Set of Entry and Exit Ramps for surface mounting of the ConLine Wash Platform. The wheelwashing system is also equipped with 4 entry and exit ramps for surface mounting of the ConLine wash platform .The ramps include hardware for mounting to the wash platform. The ramps grade from 0 to 15 inches and are constructed of a steel outer frame filled with rebar and concrete. The outer steel surfaces primed and finished with a top coat. External dimensions of each ramp are: 137in x 37in x 15in (L x W x H) and weigh 3,400 lbs.

WATER RECYCLING /SOLID SEPARATION TANK SYSTEMS & ACCESSORIES

1. Recycling Tank 5000 gallons to collect recycled water, sediment and sludge from the washing platform: The wheelwashing system is also equipped with recycling tank 5000 gallons of self-supporting steel construction consisting of a steel 4 mm thickness, ST 37 profile frame and plate. The tank in an empty condition is also capable of withstanding the ground pressures and forces resulting from a passing by, fully loaded truck. The tank design is of channel-section frame for statically strengthening the pump area and for location of the overflow weir; includes a removable overflow weir with screen, a removable surge plate, a 2 ½” drain plug for easy emptying of the tank. The inner and outer surfaces primed and finished with a top coat. External dimensions: 228 in l x 87 in w x 57in h, Useful volume: 5000 gallons, weight: ca. 4,200 lbs
2. Sludge-Collection Container is to collect sediment and sludge from the recycling tank automatic scraper solid removal conveyor systems. The wheelwashing system is also equipped with an hot dipped galvanized Sludge-Collection Container, manufactured of sturdy galvanized steel construction, complete with 4 lifting lugs and a tipping arm to enable easier emptying of the container, with external dimensions: 87in x 62in x 38in(L x W x H), Weight: ca. 885 lbs, capacity: 92 cubic feet.
3. Steel Sump with removable debris basket and Moby Pump compartment with removable stand to function as a collection and pumping chamber for the water and sludge slurry discharge from the surface mounted wheelwash platform. The wheelwashing system is also equipped with an in ground steel sump with removable debris basket and Moby Pump compartment with removable stand complete with 2 lifting lugs. The inner and outer surfaces of the sump pump stand and lifting arms are primed and finished with a top coat. The debris basket is fabricated of perforated steel plate and hot dipped galvanized, with external dimensions: 27in x 41in x 59in (L x W x H)

WEATHER AND HOUSING ACCESSORIES

1. All Weather Storage Container for security of the control panel and flocculent delivery system : The wheelwashing system is also equipped with a MobyDos Container, made of a steel profile frame and galvanized corrugated plate, with solid wood flooring and roof insulation, 4 lifting eyelets for locating chains or straps for placement, 2 lockable folding doors, locations and brackets for the system control panel , the Electro-mechanical flocculent dosing pump, with insulation, heating with ventilator, externally

located emergency stop button, all necessary cables and conduit within the container, dimensions:89"x 87"x87" (L x W x H), Weight: ca. 990lbs and a connected Load:1/6 hp

2. Cold Weather kit for MobyDick Recycling Tanks. The wheelwashing system is also equipped with a Cold Weather kit with insulated cover for tank consisting of sandwich construction with steel-insulation material-steel, 2x heat trace circuits and cables for flocculent delivery piping, control panel with transformer, circuits, each 1500 watts, 1 phase for 8x 1500watt immersion heaters

END OF SECTION