

SECTION 15484 MECHANICAL FLUID EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following types of equipment for permanent installation in mechanical fluid systems:
1. Oil and Grease Pumps
 2. Diaphragm pumps
 3. Pump Accessories
 4. Hose Reels
 5. Hose Reel Accessories
 6. Dispensing Valves
 7. Digital Fluid Inventory Control System
 8. PC Based Fluid Inventory Control System
 9. PC Based Wireless Fluid Inventory Control System
 10. Waste Oil pump System
 11. Portable Waste Oil Drains
 12. Rolling Waste oil Pit Drains

1.2 SYSTEM PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressure Ratings: Except where otherwise indicated, the following are minimum pressure requirements:
1. Low Pressure Piping (0 – 300 PSIG): Copper Schedule K. Typically City Water, Compressed Air, or Anti-Freeze/Windshield Washer Fluid with a Diaphragm Pump. Use ½” for runs up to 150 Feet, ¾” for runs from 150 to 300 Feet, and 1” for runs over 300 Feet. Branches to Dispense points shall be ½”.
 2. Medium Pressure Piping (300 – 2000 PSIG): Annealed Steel Tubing SAE J525 or J526 with either Parker Ferrulok, [Swagelok](#) or Lenz O-ring fittings. Typically Oils with a 3:1 to 10:1 ratio Reciprocating Pump. Use ⅝” by .035 wall for runs up to 150 Feet, ¾” by .035 wall for runs from 150 to 300 Feet, and 1” by .049 wall for runs over 300 Feet. Branches to Dispense points shall be ⅝”.
 3. High Pressure Piping (2000 – 10,000 PSIG): Annealed Steel Tubing SAE J525 or J526 with either Parker Ferrulok or Lenz O-ring fittings. Typically Grease with a 55:1 ratio Reciprocating Pump. Use ⅝” by .083 wall for runs up to 150 Feet, ¾” by .095 wall for runs from 150 to 300 Feet, and 1” by .120 wall for runs over 300 Feet. Branches to Dispense points shall be ⅝”.

1.3 SUBMITTALS

- A. Product data including size, dimension, capacity, pressure rating, settings, and operating characteristics of selected models, for the following:
1. Each type and size of transfer or supply pump
 2. Each system specialty

3. Special duty valves
- B. Coordination drawings for piping systems, including required clearances and relationships to other services that serve the same work area.
- C. Wiring diagrams detailing wiring for power, signal, and control systems differentiating between manufacturer-installed wiring and field-installed wiring.
- D. Maintenance data for each type and size of equipment specified to include in the “Operating and Maintenance Manual”.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with provisions of the following:
 1. NFPA 31 & 32 for oil piping materials, components, installations, inspection, and testing.
 2. Provide listing/approval stamp, label, or other marking on equipment made specified standards.
 3. Listing & Labeling: Provide equipment and accessories that are listed and labeled.
 4. UL 778 “Standard for Motor Operated Water Pumps” for construction requirements. Include UL listing and labeling.
 5. NFPA 70 “National Electrical Code” for electrical components and installation.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store equipment in a clean, dry location.
- B. Retain shipping protective covers and protective coatings during storage.
- C. Protect bearings and couplings against damage from sand, grit, or other foreign matter.
- D. Comply with equipment manufacturer’s rigging instructions for handling.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with the requirements of this specification, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 1. Samson
 2. Graco

3. ARO.

2.2 COMPRESSED AIR POWERED LINEAR RECIPROCATING LUBE PUMP - GENERAL

- A. All lubricant pumps shall be designed to pump grease or oil to within one inch of the bottom of the product container to ensure maximum use of purchased material.
- B. All pumps shall be designed to stand free of the bottom of the container to allow unobstructed flow of product to the pumping tube.
- C. All pumps shall be of the self-priming design. Pumps so designated for use in bulk supply tanks shall be equipped with a low oil shut off device to prevent free cycling of the pump in the event the product supply is exhausted.
- D. All pumps shall be equipped with an overrun air control valve to disable the pump in the event of a catastrophic failure of the piping system.
- E. All pumps shall have an air motor design with no metal-to-metal seals to prevent air leakage in the stalled condition. The air motor cylinder shall be of aluminum construction to prevent corrosion in the presence of a contaminated air supply. The air piston shall be of one-piece molded NBR construction to give a long trouble free service life. The air valve shall be of simplified construction with no more than three moving parts. The piston rod shall be finished to a surface tolerance of $.25\mu\text{m}$ and hard electroless nickel coated for maximum seal life and low friction. Oil and Grease pumps shall be of the centerline design, for even wear distribution and minimal repair costs.
- F. All pumps shall be equipped with bronze non-wearing, non fouling, and non icing mufflers to meet and exceed OSHA recommendations for noise generation.
- G. All pumps shall be double acting to provide continuous even flow and pressure and maximum utilization of the compressed air supply.
- H. All pumps shall have primary and secondary self-lubricating throat seals constructed of copper impregnated Turcon™ number 46 with Nitrile back up rings.
- I. All pumps shall have case hardened seats and ball checks for maximum service life and resistance to damage from contaminated product.
- J. All pumps shall be easily serviceable with no special tools required.
- K. All pumps shall be individually factory tested and verified for proper function. This test shall consist of a minimum of one-hour intermittent operation pumping product against full operating pressure.
- L. All pumps shall carry a minimum two-year warranty covering parts and on-site labor against defects in material or workmanship.

2.3 COMPRESSED AIR POWERED LINEAR RECIPROCATING LUBE PUMPS

- A. 1:1 Ratio Stub Type Pump for Multi-Fluid Multi-Purpose Dispensing:
1. This pump is excepted from the general pump specification, and is specified as follows. The wetted parts shall be constructed of aluminum, dichromate steel, 304 stainless steel, nylon, Teflon™, and Viton™. This pump shall be suitable for and compatible with a variety of mildly corrosive liquids, including but not limited to solvents, cleaning fluids, Anti-Freeze, detergents, alcohol (windshield washer solvent), turpentine, methyl chloride, petroleum based chemicals, inks, and any other liquid or solution of acceptable viscosity compatible with all of the wetted parts listed above.
 2. This pump shall have an air motor diameter of 1 1/2 inches.
 3. This pump shall have an air inlet of 1/4" and fluid outlet of 3/8" NPTF compatible threads. This pump shall include an air inlet regulation valve.
 4. This pump shall have a multi-purpose mounting base with 3/4" NPTM and 3/8" NPTF fluid inlet connection threads, as well as a male barb for 1/2" ID hose.
 5. This pump shall be rated for and capable of operating at a minimum air pressure of 30psi and maximum air pressure of 120psi. The maximum fluid pressure will be 120psi.
 6. This pump shall be capable of producing a maximum free flow rate of 5 gallons per minute, and a continuous duty flow rate of 2 gallons per minute.
 7. Shipping weight for the bare pump shall be no greater than three pounds.
 8. This pump shall include all accessories customarily incorporated into this model.
- B. 1:1 Ratio Stub Type Pump for Transfer of High Volumes of Fluid for Short Distances at Low Pressure Drops:
1. In addition to meeting all of the general pump specifications, this pump shall also have the following features. Construction of corrosion resistant parts including aluminum and alloy steel with polyurethane and Nitrile seals. This pump shall be compatible with all types of mineral and most synthetic oils, diesel and kerosene. Also able to pump non-corrosive liquids of acceptable viscosity that are compatible with the materials listed above.
 2. This pump shall have an air motor diameter of 2 1/8 inches and a minimum 4-inch pumping stroke.
 3. This pump shall have an air inlet of 1/4" NPTF and fluid outlet of 3/4" NPTF.
 4. This pump shall have a 1" NPTF fluid inlet connection threads for wall mounting or custom suction tube lengths, as well as outside O ring sealed machine threads for optional standard length suction tubes available for all standard dispensing containers.

5. This pump shall be rated for and capable of operating at a minimum air pressure of 40psi and maximum air pressure of 140psi. The maximum fluid pressure will be 140psi.
 6. This pump shall be capable of producing a maximum free flow rate of 16.4 gallons per minute, with a maximum discharge head @140psi of 359 feet.
 7. This pump shall have an average air consumption no greater than 7 CFM @ 100psi.
 8. This pump shall include a 2" die cast metal sliding bung mounting adapter to allow infinite adjustment of the depth of the pump in the product container.
 9. Shipping weight for the bare pump shall be no greater than 10 pounds.
 10. This pump shall include all accessories customarily incorporated into this model.
- C. 3:1 Ratio Stub Type Pump for use in Fluid Distribution Systems which include Pipe Lines, Hose Reels, and Metered Control Handles:
1. In addition to meeting all of the general pump specifications, this pump shall also have the following features. Construction of corrosion resistant parts including aluminum and alloy steel, with polyurethane and Nitrile seals. This pump shall be compatible with all types of mineral and most synthetic oils, diesel and kerosene. Also able to pump non-corrosive liquids of acceptable viscosity that are compatible with the materials listed above.
 2. This pump shall have an air motor diameter of 2 1/8 inches and a minimum 4-inch pumping stroke.
 3. This pump shall have an air inlet of 1/4" NPTF and fluid outlet of 3/4" NPTF.
 4. This pump shall have a 3/4" NPTF fluid inlet connection threads for wall mounting or custom suction tube lengths, as well as outside O ring sealed machine threads for optional standard length suction tubes available for all standard dispensing containers.
 5. This pump shall be rated for and capable of operating at a minimum air pressure of 40psi and maximum air pressure of 140psi. The maximum fluid pressure will be 420psi.
 6. This pump shall be capable of producing a maximum free flow rate of 8.5 gallons per minute, with a maximum discharge head @140psi of 1,077 feet.
 7. This pump shall have an average air consumption no greater than 5 CFM @ 100psi.
 8. This pump shall include a 2" die cast metal sliding bung mounting adapter to

allow infinite adjustment of the depth of the pump in the product container.

9. Shipping weight for the bare pump shall be no greater than 10 pounds.
10. This pump shall include all accessories customarily incorporated into this model.

D. 1:1 Ratio Stub Type Pump for Transfer of High Volumes of Fluid for Short Distances at Low Pressure Drops:

1. In addition to meeting all of the general pump specifications, this pump shall also have the following features. Divorced construction with wetted parts consisting of dichromate steel, 304 stainless steel, nylon, Teflon™, and Viton™. This pump shall be suitable for and compatible with a variety of mildly corrosive liquids, including but not limited to solvents, cleaning fluids, Anti-Freeze, detergents, alcohol (windshield washer solvent), turpentine, methyl chloride, petroleum based chemicals, inks, and any other liquid or solution of acceptable viscosity compatible with all of the wetted parts listed above.
2. This pump shall have an air motor diameter of 2 1/8 inches and a minimum 4-inch pumping stroke.
3. This pump shall have an air inlet of 1/4" NPTF and fluid outlet of 1" NPTF.
4. This pump shall have a 1" NPTF fluid inlet connection threads for wall mounting or custom suction tube lengths.
5. This pump shall be rated for and capable of operating at a minimum air pressure of 40psi and maximum air pressure of 140psi. The maximum fluid pressure will be 140psi.
6. This pump shall be capable of producing a maximum free flow rate of 16.4 gallons per minute, with a maximum discharge head @140psi of 359 feet.
7. This pump shall have an average air consumption no greater than 7 CFM @ 100psi.
8. This pump shall include a 2" die cast metal sliding bung mounting adapter to allow infinite adjustment of the depth of the pump in the product container.
9. Shipping weight for the bare pump shall be no greater than 18 pounds.
10. This pump shall include all accessories customarily incorporated into this model.

E. 55:1 Ratio Pump for use in High Pressure Grease Distribution Systems which include Pipe Lines, Hose Reels, and Control Handles:

1. In addition to meeting all of the general pump specifications, this pump shall also have the following features. Construction of corrosion resistant parts including aluminum, alloy steel, and Nitrile seals. This pump shall be compatible with all

types of mineral and synthetic greases. Also able to pump non-corrosive high viscosity products that are compatible with the materials listed above.

2. This pump shall have an air motor diameter of 2.75 inches and a stroke of 1.5 inches.
 3. This pump shall have an air inlet of 1/4" NPTF and product outlet of 1/4" NPTF.
 4. This pump shall be equipped with an intake filter screen, shovel valve, and 1/4" NPTM by 1/2-27M connection adapter. This pump shall be available in three configurations for the three product containers commercially available for grease.
 5. This pump shall be rated for and capable of operating at a minimum air pressure of 40psi and maximum air pressure of 140psi. The maximum outlet pressure will be 8,100psi.
 6. This pump shall be capable of producing a maximum free flow rate of 1.1 pounds per minute.
 7. This pump shall have an average air consumption no greater than 5 CFM @ 100psi.
 8. This pump shall include a 2" die cast metal sliding bung mounting adapter to allow infinite adjustment of the depth of the pump in the product container.
 9. Shipping weight for the bare pump shall be no greater than 17 pounds.
 10. This pump shall include all accessories customarily incorporated into this model.
- F. 55:1 Ratio Pump for use in High Pressure Grease Distribution Systems which include Pipe Lines, Hose Reels, and Control Handles:
11. In addition to meeting all of the general pump specifications, this pump shall also have the following features. Construction of corrosion resistant parts including aluminum, alloy steel, and Nitrile seals. This pump shall be compatible with all types of mineral and synthetic greases. Also able to pump non-corrosive high viscosity products that are compatible with the materials listed above.
 12. This pump shall have an air motor diameter of 3 inches and a stroke of 3 inches.
 13. This pump shall have an air inlet of 3/8" NPTF and product outlet of 3/8" NPTF.
 14. This pump shall be equipped with a shovel valve for positive priming. This pump shall be available in three configurations for the three product containers commercially available for grease.
 15. This pump shall be rated for and capable of operating at a minimum air pressure of 40psi and maximum air pressure of 140psi. The maximum outlet pressure will be 8,100psi.

16. This pump shall be capable of producing a maximum free flow rate of 3.1 pounds per minute.
 17. This pump shall have an average air consumption no greater than 5 CFM @ 100psi.
 18. This pump shall include a 2" die cast metal sliding bung mounting adapter to allow infinite adjustment of the depth of the pump in the product container.
 19. Shipping weight for the bare pump shall be no greater than 17 pounds.
 20. This pump shall include all accessories customarily incorporated into this model.
- G. 5:1 Ratio Stub Type Pump for use in High Volume Fluid Distribution Systems which include Pipe Lines, Hose Reels, and Metered Control Handles:
1. This pump shall be capable of servicing multiple outlets simultaneously. In addition to meeting all of the general pump specifications, this pump shall also have the following features. Construction of corrosion resistant parts including aluminum and alloy steel, with polyurethane and Nitrile seals. This pump shall be compatible with all types of mineral and most synthetic oils, high viscosity gear oils, diesel and kerosene. Also able to pump non-corrosive liquids of high viscosity that are compatible with the materials listed above.
 2. This pump shall have an air motor diameter of 3 1/2 inches and a minimum 4-inch pumping stroke.
 3. This pump shall have an air inlet of 3/8" NPTF and fluid outlet of 1" NPTF.
 4. This pump shall have a 1" NPTF fluid inlet connection threads for wall mounting or custom suction tube lengths, as well as outside O ring sealed machine threads for optional standard length suction tubes available for all standard dispensing containers.
 5. This pump shall be rated for and capable of operating at a minimum air pressure of 40psi and maximum air pressure of 140psi. The maximum fluid pressure will be 700psi.
 6. This pump shall be capable of producing a maximum free flow rate of 10 gallons per minute, with a maximum discharge head @140psi of 1,795 feet.
 7. This pump shall have an average air consumption no greater than 7 CFM @ 100psi.
 8. This pump shall include a 2" die cast metal sliding bung mounting adapter to allow infinite adjustment of the depth of the pump in the product container.

9. Shipping weight for the bare pump shall be no greater than 18 pounds.
 10. This pump shall include all accessories customarily incorporated into this model.
- H. 8:1 Ratio Stub Type Pump for use in High Volume Fluid Distribution Systems which include Pipe Lines, Hose Reels, and Metered Control Handles:
1. This pump shall be capable of servicing multiple outlets simultaneously. In addition to meeting all of the general pump specifications, this pump shall also have the following features. Construction of corrosion resistant parts including aluminum and alloy steel, with polyurethane and Nitrile seals. This pump shall be compatible with all types of mineral and most synthetic oils, high viscosity gear oils, diesel and kerosene. Also able to pump non-corrosive liquids of very high viscosity that are compatible with the materials listed above.
 2. This pump shall have an air motor diameter of 3 1/2 inches and a minimum 4-inch pumping stroke.
 3. This pump shall have an air inlet of 3/8" NPTF and fluid outlet of 1" NPTF.
 4. This pump shall have a 3/4" NPTF fluid inlet connection threads for wall mounting or custom suction tube lengths, as well as outside O ring sealed machine threads for optional standard length suction tubes available for all standard dispensing containers.
 5. This pump shall be rated for and capable of operating at a minimum air pressure of 40psi and maximum air pressure of 140psi. The maximum fluid pressure will be 1120psi.
 6. This pump shall be capable of producing a maximum free flow rate of 8 gallons per minute, with a maximum discharge head @140psi of 2,872 feet.
 7. This pump shall have an average air consumption no greater than 7 CFM @ 100psi.
 8. This pump shall include a 2" die cast metal sliding bung mounting adapter to allow infinite adjustment of the depth of the pump in the product container.
 9. Shipping weight for the bare pump shall be no greater than 18 pounds.
 10. This pump shall include all accessories customarily incorporated into this model.
- I. 3:1 Ratio Stub Type Pump for use in High Volume Fluid Distribution Systems which include Pipe Lines, Hose Reels, and Metered Control Handles:
1. This pump shall be capable of servicing multiple outlets simultaneously. In addition to meeting all of the general pump specifications, this pump shall also have the following features. Divorced construction with wetted parts consisting of dichromate steel, 304 stainless steel, nylon, Teflon™, and Viton™. This pump

shall be suitable for and compatible with a variety of mildly corrosive liquids, including but not limited to solvents, cleaning fluids, Anti-Freeze, detergents, alcohol (windshield washer solvent), turpentine, methyl chloride, petroleum based chemicals, inks, and any other liquid or solution of acceptable viscosity compatible with all of the wetted parts listed above.

2. This pump shall have an air motor diameter of 3 1/2 inches and a minimum 4-inch pumping stroke.
 3. This pump shall have an air inlet of 3/8" NPTF and fluid outlet of 1" NPTF.
 4. This pump shall have a 1" NPTF fluid inlet connection threads for wall mounting or custom suction tube lengths.
 5. This pump shall be rated for and capable of operating at a minimum air pressure of 40psi and maximum air pressure of 140psi. The maximum fluid pressure will be 420psi.
 6. This pump shall be capable of producing a maximum free flow rate of 16.3 gallons per minute, with a maximum discharge head @140psi of 1,077 feet.
 7. This pump shall have an average air consumption no greater than 7 CFM @ 100psi.
 8. This pump shall include a 2" die cast metal sliding bung mounting adapter to allow infinite adjustment of the depth of the pump in the product container.
 9. Shipping weight for the bare pump shall be no greater than 25 pounds.
 10. This pump shall include all accessories customarily incorporated into this model.
- J. 10:1 Ratio Stub Type Pump for use in Very High Volume Fluid Distribution Systems which include long runs of Pipe Lines, multiple banks of Hose Reels, and High Volume Metered Control Handles:
1. This pump shall be capable of servicing multiple high volume outlets simultaneously. In addition to meeting all of the general pump specifications, this pump shall also have the following features. Construction of corrosion resistant parts including aluminum, alloy steel, with polyurethane and Nitrile seals. This pump shall be compatible with all types of mineral and most synthetic oils, high viscosity gear oils, diesel and kerosene. Also able to pump non-corrosive liquids of high viscosity that are compatible with the materials listed above.
 2. This pump shall have an air motor diameter of 6 inches and a minimum 4-inch pumping stroke.
 3. This pump shall have an air inlet of 1/2" NPTF and fluid outlet of 3/4" NPTF.
 4. This pump shall have a 1-1/2" NPTF fluid inlet connection threads for wall

mounting or custom suction tube lengths.

5. This pump shall be rated for and capable of operating at a minimum air pressure of 40psi and maximum air pressure of 180psi. The maximum fluid pressure will be 1800psi.
 6. This pump shall be capable of producing a maximum free flow rate of 16.3 gallons per minute, with a maximum discharge head @180psi of 4,462 feet.
 7. This pump shall be capable of and rated for 100 cycles per minute.
 8. This pump shall include a 2" die cast metal sliding bung mounting adapter to allow infinite adjustment of the depth of the pump in the product container.
 9. Shipping weight for the bare pump shall be no greater than 35 pounds.
 10. This pump includes all accessories customarily incorporated into this model.
- K. 55:1 Ratio Pump for use in high volume, high pressure high volume Grease Distribution Systems which include long runs of Pipe Lines, multiple banks of Hose Reels, and Control Handles:
1. This pump shall be capable of servicing multiple outlets simultaneously. In addition to meeting all of the general pump specifications, this pump shall also have the following features. Construction of corrosion resistant parts including aluminum, alloy steel, with polyurethane and Nitrile seals. This pump shall be compatible with all types of mineral and synthetic greases. Also able to pump non-corrosive extremely high viscosity products that are compatible with the materials listed above.
 2. This pump shall have an air motor diameter of 6.25 inches and a minimum 4.25-inch pumping stroke.
 3. This pump shall have an air inlet of 1/2" NPTF and product outlet of 3/8" NPTF.
 4. This pump shall be equipped with a shovel valve to aid priming of the suction tube. This pump shall be available in three configurations for the three product containers commercially available for grease.
 5. This pump shall be rated for and capable of operating at a minimum air pressure of 40psi and maximum air pressure of 180psi. The maximum outlet pressure will be 9,900psi.
 6. This pump shall be capable of producing a maximum free flow rate of 9.9 pounds per minute.
 7. This pump shall be capable of and rated for 100 cycles per minute.
 8. This pump shall include threaded mounting holes for direct mounting to cover of

the product container. This pump shall also include a pneumatic lift assembly for drum replacement

9. Shipping weight for the bare pump shall be no greater than 35 pounds.
10. This pump shall include all accessories customarily incorporated into this model.

2.4 COMPRESSED AIR POWERED DIAPHRAGM PUMP – GENERAL

- A. This pump shall be a double acting double diaphragm pump with a self-lubricating non-stalling air valve.
- B. This pump shall be of the self-priming design. This pump shall be compatible with a variety of fluids, including Anti-Freeze, water, windshield washer fluid, and waste oil.
- C. This pump shall be abrasion resistant, and able to handle suspended solids of up to 1/8" OD.
- D. This pump shall have dual inlet capability for 50-50 product mixture.
- E. This pump includes all accessories customarily incorporated into this model.

2.5 PUMP ACCESSORIES

- A. Service Shut off Valves:
 1. All pumps shall be equipped with a service shut off valve to isolate the pump from the system for testing or service. This valve shall be rated for a working pressure greater than the maximum output pressure of the pump for which it is intended.
 2. Service valves include: Low-pressure 1/2", 3/4" and 1" valves, Medium-pressure 1/2", 3/4" and 1" valves, and High-pressure 1/2", 3/4" and 1" valves.
- B. Follower Plate:
 1. All grease pumps shall be equipped with follower plates constructed of steel with flexible seals and a handle for easy transfer.
 2. Follower plates shall be for: 35lb. Containers, 120lb. Containers, and 400lb. containers.
- C. Filters regulators and lubricators:
 1. Each compressed air powered linear reciprocating lube pump shall have incorporated into its supply line a filter, regulator and lubricator assembly. This assembly shall be securely mounted to the wall or the pump. The filter shall be equipped with an automatic drain and the regulator shall be equipped with an air

gauge.

2. Each compressed air powered diaphragm pump shall have incorporated into its supply line a filter regulator assembly. This assembly shall be securely mounted to the wall or the pump. The filter shall be equipped with an automatic drain and the regulator shall be equipped with an air gauge.

2.6 SPRING DRIVEN STANDARD DUTY ENCLOSED HOSE REELS - GENERAL

- A. All reels shall be constructed of powder coated carbon steel and enclosed with a powder coated die cast metal housing for maximum durability.
- B. All reels shall be adjustable for wall, ceiling, or floor mounting.
- C. All reels shall have a powder-coated carbon steel reinforced base to resist deformation from operator induced side loading.
- D. All reels shall have heavy duty hubs constructed of induction hardened forged brass for maximum durability, product compatibility, interchangeability, and corrosion resistance. Hubs shall be full flow ported and rated for a maximum pressure of 8,000psi.
- E. All reels shall have heavy-duty six-roller outlet assembly for maximum hose life.
- F. All reels shall have a safety wound and riveted steel spring rated for a minimum of five million cycles. This spring to be mounted in a steel canister for safe removal during service operations. This spring shall have a free float mounting to prevent damage from uncontrolled hose fly back.
- G. All reels shall have a conical hose stopper for operator safety when retracting the hose.
- H. All reels shall have a minimum of nine possible locking positions on the positive latching mechanism. The latch pawl shall be constructed of chrome-plated Zamak® for maximum durability. Latch mechanism shall be of the non-sparking design.
- I. All reels shall be have a hub mounted spring tension adjuster for simplified adjustments that do not require removal of the control handle or relief of the system pressure.
- J. Swivels for the reels shall be as follows. High pressure swivels shall be constructed entirely of alloy steel and have a full circumference polyurethane lip seal. Medium and Low pressure swivels shall be constructed of alloy steel and brass for maximum corrosion resistance and have a full circumference Nitrile lip seal.
- K. Hoses for the reels shall be as follows. Low-pressure hoses shall be fabric braid reinforced with permanent hose ends. Medium pressure hoses shall be single wire braid reinforced and flame resistant sheathed with permanent hose ends. High-pressure hoses shall be multiple wire braid reinforced and flame resistant with permanent hose ends. All hoses shall have a swivel fitting on one end to facilitate installation and service.

2.7 SPRING DRIVEN OPEN HOSE REELS - GENERAL

- A. All reels shall be constructed of powder coated carbon steel for maximum durability.
- B. All reels shall have double pedestal side supports and dual hose guide arms, adjustable for wall, ceiling, or floor mounting.
- C. All reels shall have a powder coated welded carbon steel reinforced base to resist deformation from operator induced side loading.
- D. All reels shall have heavy duty hubs constructed of induction hardened forged brass for maximum durability, product compatibility, interchangeability, and corrosion resistance. Hubs shall be full flow ported and rated for a maximum pressure of 8,000psi.
- E. All reels shall have a heavy-duty four-piece roller outlet assembly for maximum hose life.
- F. All reels shall have a safety wound and riveted steel spring rated for a minimum of five million cycles. This spring to be mounted in a steel canister for safe removal during service operations. This spring shall have a free float mounting to prevent damage from uncontrolled hose fly back.
- G. All reels shall have a conical hose stopper for operator safety when retracting the hose.
- H. All reels shall have a minimum of nine possible locking positions on the positive latching mechanism. The latch pawl shall be constructed of chrome-plated Zamak® for maximum durability. Latch mechanism shall be of the non-sparking design.
- I. All reels shall be have a hub mounted spring tension adjuster for simplified adjustments that do not require removal of the control handle or relief of the system pressure.
- J. Swivels for the reels shall be as follows. High pressure swivels shall be constructed entirely of alloy steel and have a full circumference polyurethane lip seal. Medium and Low pressure swivels shall be constructed of alloy steel and brass for maximum corrosion resistance and have a full circumference Nitrile lip seal.
- K. Hoses for the reels shall be as follows. Low-pressure hoses shall be fabric braid reinforced with permanent hose ends. Medium pressure hoses shall be single wire braid reinforced and flame resistant sheathed with permanent hose ends. High-pressure hoses shall be multiple wire braid reinforced and flame resistant with permanent hose ends. All hoses shall have a swivel fitting on one end to facilitate installation and service.
- L. Standard duty hose reels:
 - 1. In addition to meeting all of the general specifications, this reel shall have a maximum capacity of up to 40' of 1/2" hose.
 - 2. Standard duty hose reels shall include: Air reels, water reels, anti-freeze reels, windshield washer fluid reels, motor oil reels, gear oil reels, chassis grease reels.

M. Heavy duty large capacity hose reels:

1. In addition to meeting all of the general specifications, this reel shall have a maximum capacity of up to 60' of 1/2" hose.
2. This reel shall have a welded powder coated carbon steel base and constructed of 50% thicker gauge steel than a standard duty reel.
3. This reel shall be equipped with an extended wrap free-floating retraction spring for longer hose length capacities.
4. This reel shall have a separate mounting base constructed of three plates of steel for the previously specified hose roller outlet.
5. This reel shall be equipped with a solid steel reinforcing tie bar connecting the dual outlet arms.
6. Large capacity hose reels shall include: air reels, water reels, anti-Freeze reels, windshield washer fluid reels, motor oil reels, gear oil reels, chassis grease reels.

N. Super Heavy Duty Extra Large Capacity Hose Reels:

1. In addition to meeting all of the general specifications, this reel shall have a maximum capacity of up to 50' of 3/4" or 75' of 1/2" hose.
2. This reel shall have a welded powder coated carbon steel base and constructed of thicker gauge steel than a heavy duty reel.
3. This reel shall be equipped with an extended wrap free-floating retraction spring for longer hose length capacities.
4. This reel shall have a separate mounting base constructed of three plates of steel for the previously specified hose roller outlet.
5. This reel shall be equipped with a solid steel reinforcing tie bar connecting the dual outlet arms.
6. Large capacity hose reels shall include: air reels, water reels, anti-Freeze reels, windshield washer fluid reels, motor oil reels, and gear oil reels.

2.8 HOSE REEL ACCESSORIES

A. Electric cord reels:

1. Power supply electric cord reels shall be of the fully enclosed type with 30' of 16/3 cord and one piece molded three prong grounded connectors. These reels shall be rated for a maximum of ten amps and be equipped with a three outlet connector.

2. Double power supply electric cord reels shall be of the open style with 40' of oil resistant 14/3 cord. The outlet box shall be enclosed in steel, grounded, and have spring-loaded covers over the two provided outlets. The reel base shall be constructed of powder-coated steel for durability and corrosion resistance. Brushes shall be of the replaceable carbon type for maximum service life.
3. Trouble light electric cord reels shall be of the fully enclosed type with 40' of 18/2 cord and 'stubby' type fluorescent light. The switching mechanism shall be located on the body of the reel to reduce the possibility of sparking in the work area. The ballast shall be integral for simplified installation.

B. Reel mounting channels and brackets:

1. Reel banks shall be mounted on a predrilled, powder coated carbon steel mounting channel. Five reel mounting channels shall be secured to the I beam with four channel mounting brackets, and three reel mounting channels shall be secured with three mounting brackets.
2. Individual reels mounted to an I beam shall be secured to the flange with a mounting kit consisting of two predrilled and preformed mounting plates secured with zinc plated fasteners.

C. Inlet connection hose:

1. All reels shall be furnished with an inlet connection hose of identical construction as the previously specified outlet hoses to isolate the reel from the supply piping. The inlet connection hose shall be two feet in length and the same diameter as the outlet hose.

D. Service shut off valve:

1. All hose reels shall be equipped with a service shut off valve to isolate the reel from the system for testing or service. This valve shall be rated for a working pressure greater than the maximum output pressure of the pump which is supplying it.
2. Service shut off valves shall include: Low pressure 1/2" valves, low pressure 1" valves, medium pressure 1/2" valves medium pressure 3/4" valves, high pressure 1/2" valves.

2.9 DISPENSING VALVE

A. Low pressure control handles:

1. Air control valves shall be constructed of corrosion resistant metal with a positive sealing valve.
2. Water control valves shall be constructed of corrosion resistant metal with a positive sealing valve.

B. Medium pressure control handles:

1. All mechanical pistol grip or inline style metering control valves shall be constructed primarily of aluminum alloy for lightweight, corrosion resistance, and reduced operator fatigue. The body of the valve shall be ergonomically designed for operator comfort. The face of the meter shall feature a pointer with adequate markings to easily read the quantity of product being dispensed. The face of the meter shall also contain a non-resettable totalizing register. The valve shall be full flow ported and positive sealing. These control handles shall be available with a minimum of four different styles of outlet tube assemblies that are easily interchangeable for maximum versatility. These outlet tube assemblies shall feature semi automatic positive sealing anti drip tips to maintain a safe and clean work environment.
2. All electronic pistol grip or inline style metering control valves shall be constructed primarily of aluminum alloy for lightweight, corrosion resistance, and reduced operator fatigue. The body of the valve shall be ergonomically designed for operator comfort. The face of the meter shall feature a large LCD display with adequate markings to easily read the quantity of product being dispensed. The display of the meter shall also contain an easily accessible totalizing register. The valve shall be full flow ported and positive sealing. These control handles shall be available with a minimum of four different styles of outlet tube assemblies that are easily interchangeable for maximum versatility. These outlet tube assemblies shall feature semi automatic positive sealing anti drip tips to maintain a safe and clean work environment.
3. All Pre-Set electronic pistol grip or inline style metering control valves shall be constructed primarily of aluminum alloy for lightweight, corrosion resistance, and reduced operator fatigue. The body of the valve shall be ergonomically designed for operator comfort. The face of the meter shall feature a large LCD display with adequate markings to easily read the quantity of product being dispensed. The display of the meter shall also contain an easily accessible totalizing register. The valve shall be full flow ported and positive sealing. These control handles shall be equipped with outlet tube assemblies that feature semi automatic positive sealing anti drip tips to maintain a safe and clean work environment.
4. Non-metered style control valves shall be constructed primarily of aluminum alloy for lightweight, corrosion resistance, and reduced operator fatigue. The body of the valve shall be ergonomically designed for operator comfort. The valve shall be full flow ported and positive sealing. These control handles shall be available with a minimum of four different styles of outlet tube assemblies that are easily interchangeable for maximum versatility. These outlet tube assemblies shall feature semi automatic positive sealing anti drip tips to maintain a safe and clean work environment.
5. All medium pressure control valves shall be rated for a maximum working pressure of 1,500psi. All medium pressure control handles shall feature inlet

filter screens. Unitized pistol grip style control handles shall feature an infinite rotation swivel sealed with a Nitrile O ring and Teflon™ back up washer. All other medium pressure metered and non-metered control valve assemblies shall feature a ball bearing infinite rotation swivel sealed with a Nitrile O ring and Teflon™ back up washer. All medium pressure swivels shall have 1/2” NPTF inlet threads.

6. Handles shall include: Motor oil control handles, ATF control handles, coolant control handles, gear oil control handles.

C. Medium pressure high volume control handles:

1. Medium pressure high volume control valves shall be constructed primarily of alloy steel with an aluminum alloy housing for lightweight, corrosion resistance, and reduced operator fatigue. The housing of the valve shall be ergonomically designed for operator comfort. The valve shall be full flow ported and positive sealing, with a dual valve for both high and low flow dispensing. The handle shall be equipped with a spring loaded retention mechanism for hands free dispensing and a semi automatic positive sealing anti drip tip to maintain a safe and clean work environment.
2. All medium pressure high volume control valves shall be rated for a maximum working pressure of 1,800psi.
3. All medium pressure high volume control valve assemblies shall feature on the inlet a ball bearing infinite rotation swivel sealed with a Nitrile O ring and a Teflon™ back up washer and have 1/2” NPTF inlet threads.

D. High pressure control handles:

1. High-pressure control valves shall be constructed primarily of alloy steel with an aluminum alloy housing for lightweight, corrosion resistance, and reduced operator fatigue. The housing of the valve shall be ergonomically designed for operator comfort. The valve shall be full flow ported and positive sealing, with a hardened valve seat and ball for maximum life. These control handles shall be available with a minimum of four different styles of outlet tube assemblies that are easily interchangeable for maximum versatility.
2. All high-pressure control valves shall be rated for a maximum working pressure of 7,500psi. All high-pressure control valve assemblies shall feature a ball bearing infinite rotation “Z” type swivel sealed with a Nitrile O ring and Teflon™ back up washer. All high-pressure swivels shall be available with either 1/4” NPTF or 1/2-27M inlet threads.

- E. Heavy duty deluxe Oil Bar: This unit shall be designed for the bulk dispensing of up to four fluids at one station. This unit shall be constructed primarily of powder coated carbon steel for corrosion resistance and have steel working parts for maximum durability. This unit shall have positive sealing high flow valves and a drip tray to maintain a safe and clean working environment. This unit shall be compatible and

available with both mechanical and electronic metering devices.

2.10 PC BASED FLUID INVENTORY CONTROL SYSTEM

- A. PC Based Fluid Inventory Control System: This system shall provide electronic fluid inventory control and metering capability with accuracy advertised at + or – 1%. It will operate as a low voltage system to conform to most local codes and simplify installation. This system shall consist of several components; locally installed keypads throughout the working area provided for convenient access of technicians to the system, Input/Output units controlling up to eight dispense points each, and Power Supply Units to convert mains power to 24VDC. This system shall also be equipped with a PC interface and Windows based software to control and configure the system, as well as provide database and interface options for shop Management. This system shall be capable of operating a maximum of 64 dispense points, and shall be capable of dispensing simultaneously at all dispense points.
- B. PC Management: This system shall have PC Windows based software compatible with systems from 3.1 forward including NT. It shall be capable of controlling the system on the shop floor, configuring and reconfiguring the system from the PC, collect information generated from the system and store it permanently in an included database on the PC hard drive, and be able to export this information via TCP/IP and LAN. The Manufacturer shall provide onsite training to Shop Management at system startup and assist in any interface required to send information from the Fluid management system to the existing Shop accounting Software. The system shall be capable of operation independent of the PC.
- C. Keypad: These shall be PIN access controlled with a backlit LCD display and an oil resistant fascia. All floor level system functions shall be accessible via any keypad in the system, and higher-level programming and configuration functions shall be protected with a three level PIN controlled access scheme, also accessible via any Keypad. Keypads shall operate on 24VDC and communicate with I/O units via a CANBUS network. Maximum 64 Keypads.
- D. Input/Output Unit: Each unit shall control eight dispense points. Each dispense point shall be measured directly in units of 1/100th of a liter, with unit conversions completed within the software of the system. I/O units shall have on-board memory, able to store up to 1,900 completed transactions. Each I/O shall be capable of operating all dispense points under its control simultaneously. Each I/O shall operate on 24VDC and communicate with Keypads and the PC via a CANBUS network. Maximum 8 I/O units.
- E. Power Supply Units: Each PSU shall be equipped with a transformer capable of providing sufficient power to operate one I/O unit; three keypads and 8 dispense points (via the I/O unit). These units shall be factory configured for 120VAC/24VDC service, with both fuse and circuit breaker protection incorporated with the unit.
- F. Impulse meter: This meter shall be constructed primarily of aluminum alloy for lightweight and corrosion resistance. This meter shall be designed to produce 100 pulses per liter, with different units of measure calculated within the dispensing system This meter shall be of the magnetic switch oval gear style, for reliability, accuracy and ease of

service. There shall be one impulse meter per dispense point.

- G. Oil Fluid Solenoid: This solenoid valve shall be constructed primarily of aluminum alloy for lightweight and corrosion resistance, with steel working parts for maximum service life. This valve shall be equipped with a screen on the inlet to prevent contamination of the working parts of the valve. This valve shall operate on 24 volts AC and be rated for continuous duty service. This valve shall be pilot operated for minimum current draw of less than 1 amp @24VDC. This valve shall have 1/2" NPTF ports for both the inlet and the outlet for simplified installation. There shall be one solenoid per oil dispense point.
- H. Water base Fluid Solenoid: This solenoid shall be constructed primarily of brass alloy for corrosion resistance. This valve shall operate on 24 volts AC and be rated for continuous duty service. This valve shall be direct activated and draw less than 1 amp @ 24VDC. This valve shall have 1/2" NPTF ports for both the inlet and the outlet for simplified installation. There shall be one solenoid per Windshield Wash/Antifreeze dispense point.
- I. Y Strainer inline filter: This inline filter shall be constructed of forged Brass for durability. It shall have 1/2" NPTF ports for simplified installation. This filter shall be of the inline 'Y' design to allow cleaning of the filter screen without removal of the housing from the line. There shall be one Y-strainer per dispense point.
- J. Oil Thermal relief valve: This spring operated valve shall be constructed primarily of aluminum alloy for light weight and corrosion resistance, with steel working parts for maximum service life. This valve shall have 1/2" NPTF ports for both the inlet and the outlet for simplified installation. This valve shall be adjustable to provide thermal relief at pressures up to 900 PSI.
- K. Water base fluid thermal relief valve: This spring operated valve shall be constructed primarily of aluminum alloy for light weight and corrosion resistance, with steel and Buna working parts for maximum service life. This valve shall have 1/4" NPTF ports for both the inlet and the outlet for simplified installation. This valve shall be adjustable to provide thermal relief at pressures up to 250 PSI.

2.11 PC BASED WIRELESS FLUID INVENTORY CONTROL SYSTEM

- A. PC Based Fluid Inventory Control System: This system shall provide electronic fluid inventory control and metering capability with accuracy advertised at + or - 1%. It will operate as a low voltage + radio frequency system to conform to most local codes and simplify installation. This system shall consist of several components; locally installed keypads incorporating the Input/Output and Power Supply Unit function throughout the working area provided for convenient access of technicians to the system. This system shall also be equipped with a PC interface and Windows based software to control and configure the system, as well as provide database and interface options for shop Management. This system shall be capable of operating a maximum of 64 dispense points, and shall be capable of dispensing simultaneously at 16 dispense points.
- B. PC Management: This system shall have PC Windows based software compatible with systems from 3.1 forward including NT. It shall be capable of controlling aspects the system on the shop floor, configuring and reconfiguring the system from the PC, collect

information generated from the system and store it permanently in an included database on the PC hard drive, and be able to export this information via TCP/IP and LAN. The Manufacturer shall provide onsite training to Shop Management at system startup and assist in any interface required to send information from the Fluid management system to the existing Shop accounting Software. The system shall be capable of operation independent of the PC.

- C. Keypad: These shall be PIN access controlled with a backlit LCD display and an oil resistant fascia. All floor level system functions shall be accessible via any keypad in the system, and higher-level programming and configuration functions shall be protected with a three level PIN controlled access scheme, also accessible via any Keypad. Keypads shall operate on internally transformed 24VDC and communicate with other keypads and the PC via very low power RF. Each Keypad shall control a maximum of four dispense points, with a maximum of 16 keypads per system.
- D. Input/Output Unit: This function shall be incorporated into the Keypad.
- E. Power Supply Units: This function shall be incorporated into the Keypad.
- F. Impulse meter: This meter shall be constructed primarily of aluminum alloy for lightweight and corrosion resistance. This meter shall be designed to produce 100 pulses per liter, with different units of measure calculated within the dispensing system This meter shall be of the magnetic switch oval gear style, for reliability, accuracy and ease of service. There shall be one impulse meter per dispense point.
- G. Oil Fluid Solenoid: This solenoid valve shall be constructed primarily of aluminum alloy for lightweight and corrosion resistance, with steel working parts for maximum service life. This valve shall be equipped with a screen on the inlet to prevent contamination of the working parts of the valve. This valve shall operate on 24 volts AC and be rated for continuous duty service. This valve shall be pilot operated for minimum current draw of less than 1 amp @24VDC. This valve shall have 1/2" NPTF ports for both the inlet and the outlet for simplified installation. There shall be one solenoid per oil dispense point.
- H. Water base Fluid Solenoid: This solenoid shall be constructed primarily of brass alloy for corrosion resistance. This valve shall operate on 24 volts AC and be rated for continuous duty service. This valve shall be direct activated and draw less than 1 amp @ 24VDC. This valve shall have 1/2" NPTF ports for both the inlet and the outlet for simplified installation. There shall be one solenoid per Windshield Wash/Antifreeze dispense point.
- I. Y Strainer inline filter: This inline filter shall be constructed of forged Brass for durability. It shall have 1/2" NPTF ports for simplified installation. This filter shall be of the inline 'Y' design to allow cleaning of the filter screen without removal of the housing from the line. There shall be one Y-strainer per dispense point.
- J. Oil Thermal relief valve: This spring operated valve shall be constructed primarily of aluminum alloy for light weight and corrosion resistance, with steel working parts for maximum service life. This valve shall have 1/2" NPTF ports for both the inlet and the outlet for simplified installation. This valve shall be adjustable to provide thermal relief at pressures up to 900 PSI.

- K. Water base fluid thermal relief valve: This spring operated valve shall be constructed primarily of aluminum alloy for light weight and corrosion resistance, with steel and Buna working parts for maximum service life. This valve shall have 1/4" NPTF ports for both the inlet and the outlet for simplified installation. This valve shall be adjustable to provide thermal relief at pressures up to 250 PSI.

2.12 DIGITAL FLUID INVENTORY CONTROL SYSTEM

- A. Digital fluid control module: This control module shall provide electronic fluid inventory control and accurate metering capability. It will operate as a low voltage system to conform to most local codes and simplify installation. This unit shall have two LCD displays, one resettable for dispensing quantity, one non resettable for totalizing. This unit shall be capable of controlling a minimum of ten product dispensing stations for one product. This unit shall have a minimum 40-watt integral transformer to handle heavy-duty continuous service conditions. This unit shall have an integral surge suppresser for maximum protection of internal componentry.
- B. Impulse meter: This meter shall be constructed primarily of aluminum alloy for lightweight and corrosion resistance. . This meter shall be equipped with a screen on the inlet to prevent contamination of the working parts of the meter. This meter shall be available in a minimum of four configurations for accurate measurement in Gallons, Liters, Quarts, and Pints. This meter shall be of the reed switch style, for reliability and ease of service.
- C. Fluid Solenoid: This solenoid valve shall be constructed primarily of aluminum alloy for lightweight and corrosion resistance, with steel working parts for maximum service life. This valve shall be equipped with a screen on the inlet to prevent contamination of the working parts of the valve. This valve shall operate on 24 volts AC and be rated for continuous duty service. This valve shall be pilot operated for minimum current draw. This valve shall have 1/2" NPTF ports for both the inlet and the outlet for simplified installation.
- D. Ready light: This indicator light shall be enclosed in a housing and have a standard 24VAC bulb for simple replacement.
- E. Y Strainer inline filter: This inline filter shall be constructed of cast iron for durability. It shall have 1/2" NPTF ports for simplified installation. This filter shall be of the inline 'Y' design to allow cleaning of the filter screen without removal of the housing from the line.
- F. Air solenoid: This solenoid valve shall be constructed primarily of aluminum alloy for lightweight and corrosion resistance, with steel working parts for maximum service life. This valve shall be equipped with a screen on the inlet to prevent contamination of the working parts of the valve. This valve shall operate on 24 volts AC and be rated for continuous duty service. This valve shall be pilot operated for minimum current draw. This valve shall have 1/2" NPTF ports for both the inlet and the outlet for simplified installation.

- G. Thermal relief valve: This spring operated valve shall be constructed primarily of aluminum alloy for light weight and corrosion resistance, with steel working parts for maximum service life. This valve shall be equipped with a screen on the inlet to prevent contamination of the working parts of the valve. This valve shall have 1/2" NPTF ports for both the inlet and the outlet for simplified installation. This valve shall be set provide thermal relief at 900 PSI.

2.11 WASTE OIL SYSTEM

- A. Waste oil pumping system: This system shall be designed to transfer waste oil from its original collection container to the bulk waste oil storage unit. The pump for this system shall be a 1" diaphragm pump meeting the entire general diaphragm pumps specifications. This system shall also include a steel wall mounting bracket, all connection hoses, and a dry break coupler.
- B. Automatic overflow air shut off system: This system shall be designed to prevent overflow of the bulk oil storage unit. This unit shall be of the float type design for maximum reliability and also have an audible alarm. This system shall be air powered with no electronic components for maximum safety and compatibility with other system components.
- C. Portable waste oil drain 20 Gallon Capacity:
1. This drain shall be compact, with rounded corners, constructed of powder-coated steel for maximum durability and corrosion resistance.
 2. This drain shall have four wheels. The front wheels shall be caster mounted for maneuverability and the rear wheels shall be large diameter for portability over curbs and other obstructions.
 3. This unit shall have a seventeen-inch diameter five gallon powder coated steel bowl for maximum capacity and splash protection. This bowl shall feature a screen protector over the drain to prevent objects from falling into the tank. The bowl shall be mounted on a telescoping tube.
 4. This unit shall have a powder coated tubular steel handle.
 5. This unit shall have an integral oil level gauge.
 6. This unit shall be equipped with a drain valve that is convertible to a dry break coupler compatible with waste oil pumping systems.
- D. Portable waste oil drain 20 Gallon Capacity Air Evacuated:
1. This drain shall be compact, with rounded corners, constructed of powder-coated steel for maximum durability and corrosion resistance.
 2. This drain shall have four wheels. The front wheels shall be caster mounted for maneuverability and the rear wheels shall be large diameter for portability over

curbs and other obstructions.

3. This unit shall have a seventeen-inch diameter five gallon powder coated steel bowl for maximum capacity and splash protection. This bowl shall feature a screen protector over the drain to prevent objects from falling into the tank. The bowl shall be mounted on a telescoping tube.
4. This unit shall have a powder coated tubular steel handle.
5. This unit shall have an integral air regulator, safety valve, and drain hose for pressurized draining.

E. Portable Waste Oil Drain 15 Gallon Capacity:

1. This drain shall be compact, with a rounded cover, constructed of powder-coated steel for maximum durability and corrosion resistance. This unit shall include a special sixteen-gallon drum with an integral anti splash top.
2. This drain shall have four band dolly mounted caster wheels.
3. This unit shall have a seventeen-inch diameter five gallon powder coated steel bowl for maximum capacity and splash protection. This bowl shall feature a screen protector over the drain to prevent objects from falling into the tank. The bowl shall be mounted on a telescoping tube.
4. This unit shall be equipped with a drain valve that is convertible to a dry break coupler compatible with waste oil pumping systems.

F. Portable Waste Oil Drain Pedestal Mount:

1. This drain shall be compact, with rounded corners, constructed of powder-coated steel for maximum durability and corrosion resistance.
2. This drain shall be pedestal mounted.
3. This unit shall have a seventeen-inch diameter five gallon powder coated steel bowl for maximum capacity and splash protection. This bowl shall feature a screen protector over the drain to prevent objects from falling into the tank. The bowl shall be mounted on a telescoping tube.
4. This unit shall be equipped with a drain valve and a drum valve adapter.

G. Portable Waste Oil Drain Wagon:

1. This drain shall be compact, with rounded corners, constructed of 14-gauge powder coated steel for maximum durability and corrosion resistance.
2. This drain shall have four wheels. The front wheels shall be caster mounted for maneuverability and the rear wheels shall be large diameter for maximum

portability.

3. This drain shall feature built in baffles and a screen protector over the drain to prevent objects from falling into the tank. This drain shall be a maximum of nine inches high. This unit shall have a recessed shelf for draining filters.
4. This unit shall have a powder coated tubular steel handle.
5. This unit shall have a capacity of 28 gallons.
6. This unit shall be equipped with a drain valve that is convertible to a dry break coupler compatible with waste oil pumping systems.

H. Rolling Waste Oil Pit Drain:

1. This drain shall be compact, constructed of powder-coated steel for maximum durability and corrosion resistance.
2. This drain shall have four wheels. The wheels shall be adjustable to accommodate 31 1/2" to 49 1/2" pit openings
3. This unit shall have a capacity of 34 gallons. The drain shall be covered with a steel mesh anti splash screen to prevent objects from falling into the drain.
4. This unit shall be equipped with a drain valve that is convertible to a dry break coupler compatible with waste oil pumping systems.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, equipment foundations, and conditions with Installer present for compliance with requirements for installation and other conditions affecting performance of equipment. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Examine roughing-in of plumbing piping systems to verify actual locations of piping connections prior to equipment installation.

3.2 INSTALLATION

- A. General: Comply with equipment manufacturer's written installation instructions.
- B. Install equipment in locations indicated and arrange to provide access for periodic maintenance.
- C. Support piping so that weight of piping is not supported by equipment.

3.3 CONNECTIONS

- A. General: Connect piping to equipment as indicated. Install valves that are same size as piping connecting to equipment.
- B. Install pipe sizes as specified previously in sub-section 1.2.
- C. Install specified shut off valves on each pump discharge and component inlet.
- D. Install electrical connections for power, controls, and devices.
- E. Electrical power and control wiring and connections are specified in Division 16 Sections.

3.4 ADJUSTING

- A. Controls: Set controls for operation as required for system application.

3.5 COMMISSIONING

- A. Final Checks Before Startup: Perform the following preventive maintenance operations and checks before startup:
 - 1. Flush all fluid lines to remove all assembly and manufacturing debris and contamination.
 - 2. Check that pump controls are correct for required application.
- B. Starting procedure for pumps:
 - 1. Open discharge valves slowly.
 - 2. Start pumps at low air pressure until primed.
 - 3. Check general mechanical operation of equipment and adjust for maximum performance.

END OF SECTION 15484