SECTION 50 01 02- TANK MIXER

PART 1 - GENERAL

1.1 Equipment

A. Furnish and place into operation a potable tank mixer as manufactured by Medora/ Ixom Watercare, Inc. of Dickinson, ND or approved equal and as shown on the plans and specified herein.

1.2 References

A. Occupational Safety and Health Administration, OSHA

B. NSF / ANSI Standard 61

1.3 Quality Assurance

A. The mixer shall operate continuously, all day and all night, using 120 VAC as the power source.

B. The mixer shall have no visual defects, and shall have high quality welds, assembly, and corrosion resistant finish.

C. The manufacturer of the mixer shall have extensive experience in the production of such equipment, and the equipment shall be manufactured in the continental United States.

D. Delivery, placement and startup services shall be available, but not included in the bid. For factory delivery and placement, services shall be performed by full time factory employees experienced in the operation of this equipment and who have completed OSHA safety trainings applicable to this type of placement.

E. The mixer shall be warranted to be free of defects in materials and workmanship for a period of 5 years. This equipment warranty would run directly from the manufacturer of the equipment to the owner. The equipment warranty would not be part of the contract or any required bond.

1.4 Submittals

A. The manufacturer shall provide an electronic copy of the following documents. Upon acceptance of these documents by the Engineer, the manufacturer will be issued a Notice to Proceed, and may then proceed to place the mixer.

1. Manufacture Qualification Document
2. List of Supplied Mixers
3. Manufacturer Product Sheets and installation instructions
4. Electric Power Source Requirements and wiring diagram
5. NSF / ANSI Standard 61 Documentation
6. Warranty Statement
7. Operation and maintenance Manuals

PART 2 - PRODUCT

2.1 Manufactures

A. Specified Equipment. The mixer shall be manufactured by Medora/ Ixom Watercare, Inc. of Dickinson, ND or approved equal.

2.2 Performance and Features

A. The tank circulation shall be achieved by a single submerged unit within the reservoir capable of providing long distance circulation of water. The mixer shall have a direct measurable flow rate where suction shall enter specified mixer's intake and discharging water vertically in a sheet flow pattern to induce a large volume, low velocity flow to reach the tank or reservoir water surface. The mixer must be placement flexible in design to allow best hydraulic positioning for tank or reservoir conditions to prevent hydraulic short circuiting within tank or reservoir. The mixer shall be installed in "suspended configuration" (not floor configuration). The floating mixer will be hung off the tank roof and pulled out with a chain and power cable.

Mixer Installation- Suspended Configuration

Follow below mentioned installation procedures:

Step 1: Attach the retrieval chain to the GS mixer at the pre-located quick link. Tighten the quick link with a wrench/pliers. Plan out a safe procedure and hoist the GS Mixer to the top of the tank near the hatch opening. Use the chain and submersible cable attached to the GS Mixer for lifting and supporting the weight. Keep clear of chain and electric cord to avoid entanglement.

Step 2: Tie off the tail end of the retrieval chain and electric cord strain relief to the quick link at the bottom of the tank penetration fitting.

Step 3: Pull the retrieval chain up until it is taught, then mark off the desired distance the GS Mixer is to be suspended above the floor, placing the quick link that desired distance down the retrieval chain below the tank penetration fitting.

Step 4: Slowly pull up the GS Mixer and connect the quick link to the tank penetration fitting.

It is important to disinfect all components in contact with potable water. A common practice is to use a minimum 200ppm chlorine or alternate disinfectant solution in water to spray all components that will contact the drinking water. There may be additional decontamination procedures required, so it is important to understand what procedures are acceptable. Decontamination should be performed right before the unit is lowered through the hatch. The mixer should be immersed in water shortly after having been decontaminated to prevent corrosion caused by contact with chlorine or alternate disinfectant.

Mixer Removal-

The mixer will be removed through a 24" access hatch on top of the tank. The mixer with chain would weigh in at closer to 90lbs and will be lifted using the grab tool with the retrieval chain.

B. Number of units required. To meet the project objectives, the following number of mixers are required.

Qty	Model	Tank or Reservoir
1	GridBee GS-9 potable tank mixer or approved equal	Water storage tank-T-100 (22' Dia X 32' High)

C. Complete Mix: The mixer manufacturer guarantees that the subject tank will be completely mixed by the mixer. In continuous operation of the mixer:

1. At least once per 24 hours all water temperatures within the tank shall converge to within 0.8 degrees C, and

2. At least once per 72 hours all chlorine concentrations within the tank shall converge to within 0.18 mg/l.

D. Fit Through Small Hatch Opening. The mixer shall be capable of fitting through a clear, unobstructed opening of 12" diameter without requiring disassembly or assembly.

E. Continuous Operation With 120VAC, 20 Amp Power Source. The mixer shall operate continuously during day and night while connected to electric grid power.

F. Stainless Steel Construction. The mixer shall be constructed primarily of Type 316 stainless steel metal for strength and superior corrosion resistance.

G. Motor. The mixer shall be mechanically operated by a submersible motor that meets the following criteria.

1. Direct Drive, with no gearbox and no lubrication maintenance required.

2. Designed for submersible operation. Mixer design shall include flow sleeve or housing around motor to provide water flow past motor per submersible motor design criteria to lower the total motor temperature and increase winding life.

3. Designed for Continuous Operation without overheating or compromising motor life expectancy. Constant, full speed operation, variable frequency drive or other method of speed reduction not required and not allowed.

4. 120 VAC, 20 Amp power source shall be supplied by others and not the mixer manufacturer.

H. Exposed Rotating Protection. The mixer shall not have any rotating equipment openly exposed. Rotating shafts, impellers, and motors shall not be openly exposed, and in the event of any part of the mixer exterior contacting the floor or cord, it shall not cause damage to either.

I. Low Elevation Intake: The mixer shall be supplied with an intake capable of being positioned at the lowest elevation of the tank or reservoir floor.

J. Restraint System. The mixer shall allow for placement and servicing without requiring tank or reservoir to be drained. The mixer shall not require the use of a diver or diving team to enter the tank or reservoir to complete placement or service of the specified equipment.

K. Functional for All Water Levels. The mixer shall function properly and not be negatively impacted by fluctuating water levels down to 24 inches of water depth. Devices requiring more than 24 inches of water depth to properly function without damage not allowed.

L. SCADA and Controls. The mixer shall have the option to add an Electric Control Box including a motor current indicator in a 4-20mA analog output and remote on/off control via 24VDC relay.

Electrical Control Box. The mixer equipment shall be supplied with a Control Box capable of disconnecting 120 VAC outgoing power to the mixer equipment and meeting the following criteria:

1. NEMA 4X enclosure shall be provided with protection against condensation and moisture in a marine environment.

2. Control Box shall be UL 508 Listed for sound electrical design and safety.

3. Control Box shall include exterior mounted HOA switch, definite purpose contactor for mixer control, exterior display showing green run, red fault indication, and motor operating amperage, grounding lug, 120 VAC standard three-prong male molded plug, and locking latch for security.

4. Control Box shall include configurable open collector outputs for run and fault indication, or 4-20 mA analog output scaled to motor current. Control Box shall include a 24 VDC relay to allow for remote on and off control of the mixer. Integration of 4-20 mA output and remote on/off relay into site PLC/RTU shall be provided by others and not by the mixer equipment manufacture.

5. Control Box requires a 120 VAC power source, Minimum 20 Amp rated service located near the final placement of the Control Box. SCADA and control functions of the Control Box require 24 VDC incoming power for automatic operation, run and fault indication, and 4-20 mA current output. The 120 VAC and 24 VDC power source shall be supplied by others and not the mixer equipment manufacturer.

M. Maintenance Requirements. The mixer shall operate normally with the following maintenance features.

1. No scheduled lubrication is required of any system components including motor.
2. No spare parts shall be required to be kept on hand.

N. Equipment Support. The mixer manufacturer shall offer full factory support with the following staff and support services.

1. Customer Service, Application Engineering, and Equipment Engineering staff should be available by email or toll-free phone.

2. Field personnel for placing and servicing the specified mixer.

3. Public website with detailed information available describing the mixer for this project and related applications of this equipment into potable water tanks and reservoirs.

4. Service plans for preventative maintenance and continued technology improvements for the specified mixer.

PART 3 - EXECUTION

3.1 Installation

For Factory Placement, Startup, and Service, include the information below:

A. Factory Personnel. The placement and startup shall be performed by full time factory employees trained in the operation of the mixer.

B. Safety. Placement and service personnel shall have received job-specific safety training on (a) Working over Water, (b) Boating Safety, (c) Disinfecting Procedures, (d) Confined Space Entry, (e) Fall Protection, (f) Self Rescue, and (g) DOT Compliance.

C. Safety Equipment. Placement and service personnel shall be equipped with job-specific safety equipment to complete the placement and startup of specified mixer following all OSHA safety regulations. Safety equipment shall include confined space, fall protection, rescue, decontamination, and communication tools such as (air monitor, ventilation fan, tripod, winches, FBH's, retractable, ropes, lanyards, descenders, radios, hard hats, step pools, disinfectant sprayer, etc.)

3.2 Field Services

A. Equipment manufacturer shall offer placement and startup performed by equipment manufacturer's full-time factory employees trained in the operation of the mixer who have completed OSHA safety trainings applicable to this type of equipment placement and startup.

END OF SECTION