

## **Recommended Specification** **ChemScan<sup>®</sup> mini Mn - Manganese Analyzer**

An automatic analyzer for rapid “semi-continuous / batch” analysis of Manganese shall be furnished in accordance with these specifications. The analyzer shall be a “ChemScan mini Mn” Manganese Analyzer as manufactured by ASA Analytics in Waukesha, WI.

The analyzer shall automatically detect Manganese through a detection cell in potable water or wastewater samples that contain less than 150 ppm of suspended solids and less than 60 NTU turbidity. Sample flow shall be from a sample line able to deliver a minimum of one liter per minute sample flow to the analyzer at 1 to 10 psi pressure (14 – 69 kPa). (See sample source options below.) The analyzer shall also provide for automatic zeroing using analysis of a sample blank on every analysis cycle and shall provide for automatic cleaning of the flow cell using a cleaning solution recommended by the manufacturer.

The analyzer shall contain an internal pump for the introduction of cleaning solutions and a manifold to interrupt sample flow and replace it with a flow of cleaning solution, based on self-test results. Pump heads shall be easily replaceable and shall not require replacement at an interval more often than twice each year under normal operation. The internal pump shall not require replacement more often than once each year. Gravity feed of reagents or maintenance fluids and/or manual introduction of cleaning solutions and/or the use of external pumps for cleaning are not acceptable.

### **SPECIFIER TO SELECT ONE OF THE FOLLOWING SAMPLE SOURCE OPTIONS:**

- **The sample flow to the analyzer will be provided by a tee connection from an existing sample source in a by-pass line, with sample pressure at the analyzer inlet not to exceed 10 psi (69 kPa). Pressure reducers and/or hand valves to create proper back-pressure at the analyzer inlet are by others.**
- **The sample flow to the analyzer will be provided by a ChemScan Sample Extraction system, consisting of an external submersible sample pump for low solids application and a ChemScan mini Sample Pressurization Loop consisting of pipe loop, manual valves and pressure gauge. The sample supply line fittings and piping between the pump and the Sample Pressurization Loop shall be provided and installed by others.**

Internal sample flow shall not be restricted by capillary tubes, needle valves or other devices with small orifice size. No orifice in the sample flow path into or within the analyzer shall be less than 0.125 inches (3.17 mm).

The flow cell chamber shall be easily removed for cleaning without disconnection of power, sample lines, light source or detection optics. The flow cell windows shall be thermally insulated to protect from condensation. The flow cell body shall be constructed from CPVC and the cell windows shall be quartz.

The light source output intensity shall be continuously monitored prior to light transmittance through the cell to eliminate measurement variations. Maximum drift during an 8 hour period under standard conditions shall not exceed 0.1% of range.

The analyzer shall provide an operator interface including a back lit LCD display. The analyzer shall have a multiple range capability, with the ranges selectable by the operator as a menu choice. Standard operator-selectable ranges shall be 0.002 to 8.00 mg/l as Mn.

The analyzer shall not require the use of calibration standards in normal operation. Analysis of a sample blank shall be performed by the analyzer prior to every analysis. The analyzer shall allow the operator to select the desired interval between each analysis cycle, from a minimum of 5 minutes to a maximum of 99 hours, 99 minutes.

The analyzer shall permit entry of a single point calibration adjustment or automatic calculation of two point calibration adjustments for slope and offset through the entry of high and low comparison values between ChemScan and grab sample reference samples.

The analyzer shall not require change or replenishment of reagents more often than once each calendar quarter, if operated at 5 minute analysis cycles for low range analysis or if operated at 10 minute analysis cycles for high range analysis.

Reagents and analysis of samples shall use a method based on the modified 2 step Ammonia and Hydroxylamine Hydrochloride reduction principle. Formaldoxime in the reagent will form a yellow-brown colored complex and the absorbance of the complex is measured at 455 nm via colorimetric method, similar to those found in "Standard Methods of Analysis" by ASTM.

The analyzer shall provide a continuous, isolated 4-20mA analog output and RS-232 serial output. The analyzer shall provide 5000 value internal memory log, dry contact alarms with a set point configurable for a high or low value on the analyzer menu. The analyzer shall have the capability to force 4-20 mA analog data outputs to set values for output calibration purposes. The analyzer shall have internal maintenance event logs, easily downloadable to a laptop computer using MS Hyper Terminal software. The analyzer shall be supplied in a NEMA-4X fiberglass enclosure. Power for the analyzer shall be 100 watts maximum at 100 to 240 V AC, 50 / 60 Hz, 120 VAC North American cord provided. A ½" conduit size hole for a field-wired option shall be available upon removal of the cord set provided.

The analyzer shall be furnished with an Operation and Maintenance manual containing installation instructions, instructions for startup, instructions for adjustment during operation, plus instructions for periodic and routine maintenance. A startup kit consisting of 10 liter cleaning solution container assembly, sample inlet assembly, drain tube assembly, injector priming tool and one year supply of reagents for low concentration analysis shall be furnished. Reagents shall have a minimum 1 year shelf life under normal storage conditions. The analyzer shall carry a minimum warranty of one year from initial operation, not to exceed 18 months from the date of shipment, covering workmanship, materials and components.

A maintenance kit consisting of replacement pump, replacement pump head and one year supply of reagents shall be available from the analyzer manufacturer to replace the initial kit supplied with the unit by the contractor or integrator.

The analyzer shall carry a CSA-US or other approved NRTL and shall be designed to operate in an ambient environment of 5 to 50 degrees C.