SECTION 15172 - MASS FLOW GAS METERS

City of San Diego, CWP Guidelines

PART 1 -- GENERAL

1.1 WORK OF THIS SECTION

A. The WORK of this Section includes providing thermal dispersion type mass flow meters to measure the flow of sewage digester gas in sewage treatment plants.

1.2 RELATED SECTIONS

A. The WORK of the following Sections applies to the WORK of this Section. Other Sections of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this WORK.

1. Section 15150 Meters, General

PART 2 -- PRODUCTS

2.1 GENERAL

A. Operation: The mass flow meters shall be designed to operate continuously on the thermal dispersion principle, at flow rates within rated range. The meters shall be suitable for service with digester gas from sewage treatment plants. Digester gas is a moisture-saturated, corrosive gas composed of methane, carbon dioxide, nitrogen, hydrogen sulfide, and particulates.

B. **Schedule**: The meters shall comply with the following:

ID No.	Service	Pipe Size (inches)	Flow Range (SCFM)	Operating Pressure (inches W.C.)
[ ]	[ ]	[ ]	[ ]	[ ]
[ ]	[ ]	[ ]	[ ]	[ ]

2.2 CONSTRUCTION

A. **Sensor**: The mass flow meter shall be of the single insertion probe type. The insertion probe shall have flanged or one-inch screwed connections, to be installed through a packing gland and a ball valve. The packing gland shall have a 1-1/4-inch NPT connection, a packing compression collar, and a split ring locking collar. The sensor shall sense mass flow and automatically compensate for all specific changes in temperature and pressure. The sensor shall consist of two matched platinum resistance temperature detector (RTD) elements, one heated and the other passive, sheathed in a [nickel] [gold] brazed [Type 316 stainless steel] [Hastelloy C-276] insertion assembly. The gas flow shall pass directly over sheathed elements without the need for a tortuous path. The sensor probe assembly shall be mounted in a [cast iron] [aluminum] enclosure, approved for Class 1, Groups C and D hazardous areas.

B. **Characteristics**: The meter shall have the following characteristics:

1.	Accuracy	- plus or minus 1 percent (at 30 degree F)
2.	Repeatability	- plus or minus 1 percent of full scale
3.	Turndown ratio	- 100:1 (max)
4.	Signal output	- 4-20 mA, 600 ohms max. load
5.	Power input	- 115 VAC, plus or minus 15 VAC, 16 watts max.
6.	Pressure rating (psi)	- up to 1000 psig
7.	Probe temperature rating (deg. F)	- minus 50 to plus 330 deg. F (probe)
8.	Accuracy	- plus or minus one percent of full scale
9.	Gas flow velocities	- 0.5 to 200 feet per second

C. **Electronics**: The electrical components shall be [meter-mounted] [remote mounted] in a NEMA [4X] [4] [Class 1, Groups C and D] [explosion-proof] enclosure, with flow indicator and totalizer, Factory Mutual and CSA approved for hazardous locations. The electronics shall read flow in SCFM with digital display. [8-conductor interconnection cable shall be provided between sensor and remote electronics]. The unit shall be adjustable in the field for span and zero to narrow the output range.

D. **Materials**: All wetted parts of the sensor assembly shall be made of [Type 316 stainless steel with nickel braze] [Hastelloy C with gold braze]. Electronic enclosures shall be fiberglass, Type 316 stainless steel for NEMA 4, or cast iron or aluminum for explosion-proof designations.

E. **Calibrator**: The CONTRACTOR shall furnish one calibrator. The calibrator shall plug into the main circuit board in lieu of the sensor probe and shall provide simulation of the differential resistance signal produced by the flowmeter's sensor.

2.3 MANUFACTURERS

A. Mass flow meters of the type indicated shall be manufactured by one of the following (or equal):

1. FCI Fluid Components, Inc., model LT 81A

2. Kurz Instruments, Inc., series 565

PART 3 -- EXECUTION

3.1 INSTALLATION

A. **General**: Mass flow meters and equipment shall be installed in accordance with the manufacturer's written instructions.

B. All probes shall be side-mounted in a horizontal or downward flow sloping pipe, with 20 pipe diameters of straight approach and 10 pipe diameters of straight pipe downstream. An efficient moisture separator shall be installed upstream of the meter.

** END OF SECTION **