

CHEMTUBE® 200 METERING PUMP



Overview

The Chemtube 200 metering pump is a positive-displacement, piston-diaphragm pump with maximum capacities of 8, 20, and 60 gph per head with 7/8", 1-1/8", and 1-5/8" pistons, respectively, and a maximum operating range of 20:1. The drive mechanism incorporates an ac induction motor or variable speed, dc motor with a speed reducer and fixed eccentric that converts rotary motion to linear motion. The reducer and eccentric are located in the gearbox housing. The pump liquid end is of the hydraulically actuated tubular diaphragm type. Pumped fluid contacts only an elastomeric tubular diaphragm and cartridge-type check valves of PVC, Kynar, or 316 stainless steel. A flat primary diaphragm and intermediate fluid provide additional isolation between the pump's hydraulic fluid and the process. Pressure-compensating, pressure-relief, and air purge valves are all externally accessible and automatically maintain the pump's hydraulic equilibrium.

Pump output is controlled by varying the length and/or speed of the piston stroke. Stroke length and/or stroke speed control can be manual or automatic via a 4-20mA process variable input signal. Closed-loop speed regulation provides feedrate control accurate to within 0.5% of full scale.

Operation

Process fluid is pumped through the interior of a tubular elastomer diaphragm. Set vertically in the pump head, this flexible tube is surrounded by an intermediate fluid (propylene glycol). The intermediate fluid is isolated from the hydraulic fluid by a primary TFE flat diaphragm. As the piston moves forward past the control rod ports, it displaces an exact volume of hydraulic fluid. To accommodate this displacement, the flat diaphragm flexes outward into the intermediate chamber. This causes a compression of the tubular diaphragm, and the discharge of

the process fluid inside. The backstroke of the piston allows the tubular diaphragm to relax and expand its internal volume. This expansion draws process fluid into the tube through the suction inlet. Stroke length is adjusted by the accurate positioning of a control rod. Piston travel stays constant while the point where the hydraulic chamber seals varies with the location of control ports in the control rod.

Features

Available liquid end materials of construction:

- Valves – PVC, Kynar, or stainless steel
- Tubular diaphragms – Hypalon, Viton, or Teflon lined

Automatic hydraulics and internal pressure relief

Diaphragm differential pressure relief

Diaphragm leak detection

Simplex and Duplex arrangements

Flexible controls for water and wastewater treatment applications

NEMA 4 control enclosures

Rugged cast iron construction

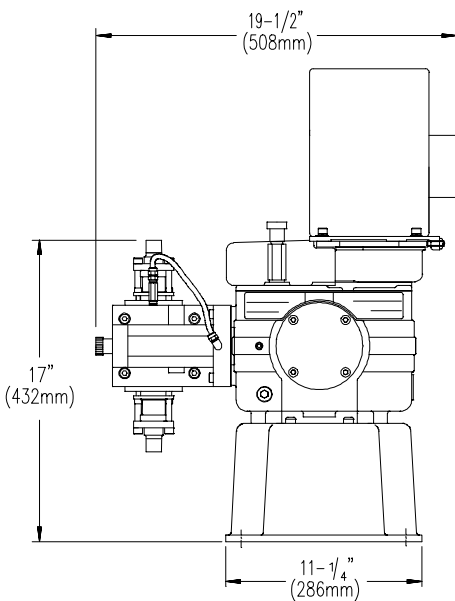
Cartridge-type valves for easy service

Non-loss-motion stroke adjustment mechanism

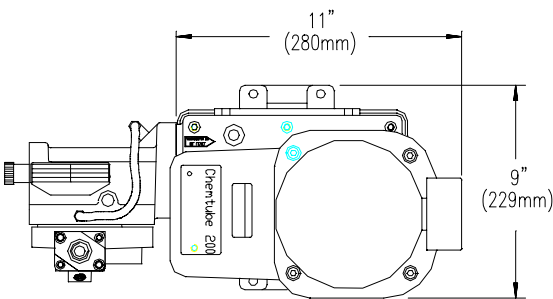
Manual or automatic stroke length control

Constant speed or variable speed drive

Direct or pulley drive



FRONT VIEW



TOP VIEW

Technical Data

Maximum Liquid Temperature

180°F for 316SS valves; 150°F for Kynar valves; 125°F for PVC valves

Control

Stroke length adjustable — Manual
Optional Electric Positioner Electrical
speed — Optional SCR

Ambient Temperature Limits

10° to 120°F

Accuracy

±1% of full scale over a 10:1 range

Operating Range

10 to 1

Suction Condition

Flooded suction recommended, suction
lift maximum five feet of water

Connections

7/8" piston suction and discharge - 3/8"
male NPT
1-1/8" piston suction and discharge 1/2"
male NPT
1-5/8" piston suction and discharge
1" male NPT

Viscosity/Stroke Speed Limits

5,000 centipoise (Brookfield spindle No.
3 @ 12 rpm)

Standard Intermediate Fluid

50/50 propylene glycol and distilled
water

DRIVE UNIT

The motor drives the worm shaft, either directly or through a four-step pulley arrangement, which, in turn, drives the worm gear/sheave guide/eccentric shaft. The different stroking speeds are determined by the pitch and thread of the worm/worm gear combination. The connecting rod rides on the sheave of the eccentric shaft and produces the reciprocating motion of the piston. The gear box is flood-lubricated.

LIQUID END

The flat disc diaphragm is flexed hydraulically in a conventional manner by the reciprocating piston. The tubular diaphragm mounted in the head is surrounded by a liquid. This liquid acts as the hydraulic coupling between the two diaphragms.

HYDRAULIC COUPLING

The piston reciprocates within an accurately sized cylinder, displacing an exact volume of oil. The oil serves as an intermediate fluid between the piston and the diaphragm. As the piston displaces the oil through its stroke, the diaphragm flexes causing the process fluid to enter or leave the pump. This concept is known as "hydraulically balanced" diaphragm, as there is no significant pressure differential across the diaphragm. This ensures that no accuracy or efficiency will be lost due to ballooning of the diaphragm or through the inability of the diaphragm to move through the entire displacement. In order to maintain the balanced hydraulic coupling, a number of different valves are used.

ELECTRONIC LEAK DETECTION (OPTIONAL)

The optional leak detection system operates on the principle of conductivity (the ability of a liquid to conduct electricity). The system consists of a conductivity probe and an electronic sensing circuit. In operation the conductivity probe passes a minute electrical current through the high resistance intermediate fluid. If there is a tubular diaphragm rupture, low-resistance process fluid is mixed with intermediate fluid, changing its conductivity, completing the circuit, and activating the alarm. This system will measure the resistivity of

PISTON DIAMETER	STROKING SPEED	CAPACITY (SIMPLEX)	MAXIMUM PRESSURE
INCHES	SPM	GPH	PSIG
7/8	36	2	390* 125**
	72	4	
	144	8	
1-1/8	36	5	390* 125**
	72	10	
	144	20	
1-5/8	36	15	125* 125**
	72	30	
	144	60	

*Valve Material: 316SS
**Valve Material: Kynar or PVC

a fluid up to 100,000 ohms.

MULTIPLE HEAD ARRANGEMENT

The Chemtube 200 hydraulically actuated diaphragm pump is available as a simplex and as a double simplex pump, powered by a common drive unit. The liquid ends can have manifolded or separate suction and discharges, and may be any combination of two capacities, but will be driven at identical speed (SPM).

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TECHNICAL DATA SHEET **P430.550**