

# **WATER PROCESS SOLUTIONS**



**Chemtube 2000**  
**Tubular Diaphragm Metering Pump**

# Robust & Reliable Chemical Metering

## Overview

The Chemtube® 2000 tubular diaphragm metering pump is hydraulically actuated and features a rugged, compact cast iron gearbox with a hydraulically balanced tubular diaphragm for accurate chemical feed and long service life. An integral automatic refill system eliminates the need for adjustment under changing operating conditions. An optional PTFE lined diaphragm provides for chemical compatibility with virtually any chemical used in the water treatment process. Three tubular diaphragm sizes are available for capacities up to 2000 l/h (525gal/h) at pressures up to 13.3 bar.

## Operation

The Chemtube® 2000 Series Pump provides accurate metering and transfer of a wide variety of chemicals and is available in three piston sizes (51, 64, and 76mm) five speeds (30, 60, 80, 120 and 144 strokes per minute), and a simplex or double simplex arrangement.

The liquid end uses two diaphragms. A flat disc diaphragm and a tubular diaphragm form a sealed intermediate chamber between the process fluid (inside the tubular diaphragm) and the hydraulic fluid (inside the piston displacement cylinder). The liquid surrounding the tubular diaphragm is a water/propylene glycol mixture (50/50) and is compatible with most process fluids. There are no mechanical connections between the two diaphragms and the pump drive. Both diaphragms are hydraulically balanced during pump operation. The disc diaphragm is driven by hydraulic fluid, which is driven by the pump piston. The piston causes the liquid in the intermediate chamber to displace the tubular diaphragm and create pumping action with each stroke of the piston.

The pump features built-in, adjustable, absolute pressure relief valve and cartridge type valves for ease of service; an automatic hydraulic fluid make-up valve that is mechanically actuated by sensing the position of the flat intermediate fluid diaphragm; a stroke adjuster (manual or optional electric) that is capable of varying the stroke from zero to 100%; and the optional electronic leak detection system that monitors the conductivity of the intermediate fluid and will automatically signal a change due to leakage through the tubular diaphragm of the process fluid. Also, when the optional Teflon-lined tubular diaphragm is used the Chemtube 2000 pump is capable of handling a variety of corrosive fluids.

## Features

- Single or double ball valves for a maximum of 15 meters water suction lift.
- Non-adjustable hydraulic refill system that also protects the diaphragm from damage due to adverse suction conditions.
- Adjustable built in pressure relief valve.
- Manual or automatic stroke length control.
- Non loss motion stroke adjustment mechanism.
- Liquid end materials of construction, Valves- PVC, Kynar or stainless steel. Tubular diaphragms- Hypalon, Viton or Teflon lined.
- Double simplex arrangement also available.
- AP1675 Compliance.

# Configured to suit Chemical Application

## 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 intermediated 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 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.

## Multiple Head Arrangement

The Chemtube 2000 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).

## 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 a fluid up to 100.000 ohms.

## Technical Details

**Maximum liquid Temperature:** 82°C for 316SS valves; 66°C for Kynar valves; 52°C for PVC valves.

**Control:** Stroke length adjustable - Manual Optional electric Positioner Electrical speed - Optional SCR.

**Ambient Temperature Limits:** -12°C (10°F) to 52°C (126°F)

**Accuracy:** +1% of full scale over a 10:1 range.

**Operating Range:** 10 to 1

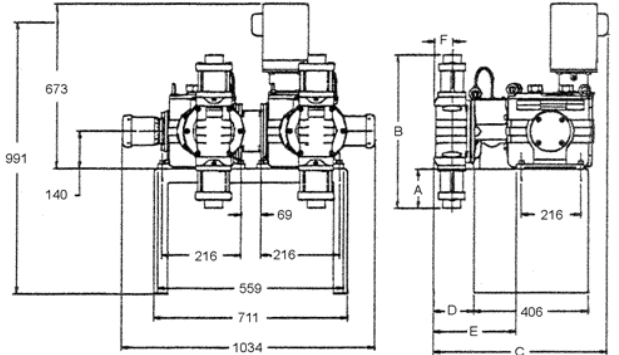
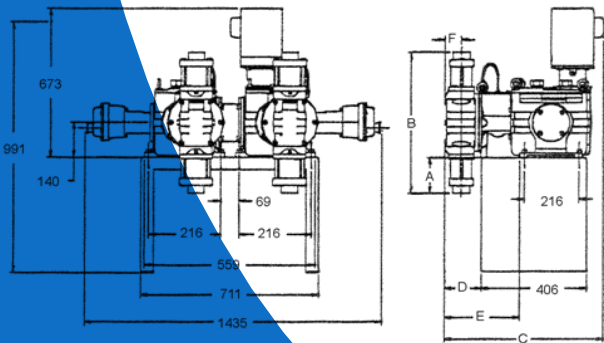
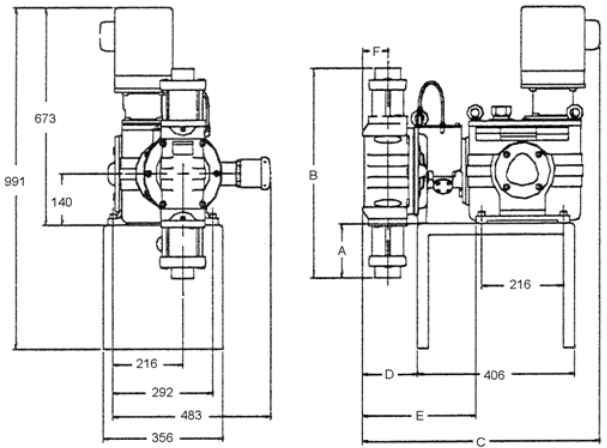
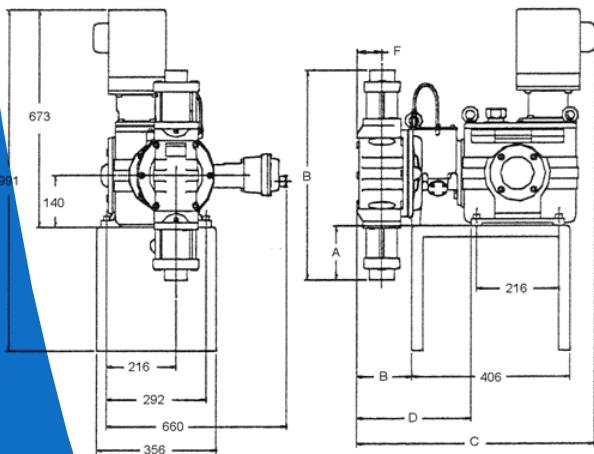
**Suction Condition:** Flooded suction recommended, suction lift maximum five feet of water.

**Viscosity/Stoke Speed Limits:** 10,000 centipoise (Brookfield Viscocometer with #2 spindle @ 12 rpm) under any condition. Higher viscosities (up to 20,000 centipoise) with decreased capacity (10-15%

**Standard Intermediate Fluid:** 50/50 propylene glycol and distilled water.

CAPACITY SPECIFICATIONS

Piston Size (mm)	50 Hz 1450 rpm		Bar Motor Kilowatts - Induction (Variable) - 1450rpm									Connections
	Stroke Frequency (spm)	Capacity (lph)	Simplex					Double Simplex				
			0.037 (0.55)	0.55 (0.75)	0.75 (1.11)	1.11 (1.49)	1.49 (2.24)	0.75 (1.11)	1.49 (2.24)	2.24 (3.73)		
51	30	144	13.3						13.3			1" NB Socket or R1
	60	291	8	12	13.3			10	13.3			
	80	390	6	8.7	12			10	13.3			
	120	583	4	6	8	13.3		6.6	13.3			
	144	700	4	6	8	8.7	13.3	6.6	13.3			
64	30	249	8.3					8.3	8.3	5	1-1/2" Socket or R1-1/2	
	60	498	4.7					5				
	80	666	3.3	7	8.3							
	120	1000	2.3	5	7	8.3	8.3		8.3			
	144	1200	2.3	3.3	4.7	7	8.3		3.3	8.3		
76	30	416	5					5			2" NB Socket or R2	
	60	833	2.7					3.3				
	80	1110	2	4.3	5				5			
	120	1667	1.3	3	4	5			3.3			
	144	2000	1.3	2	2.7	4	5		2	5		



Piston Size (mm)	A	B	C	D	E	F	Socket Connection
51	102	508	610	146	267	64	R1 or 1"NB Socket
64	152	584	635	152	279	76	R1/2 or 1 1/2"NB Socket
76	210	711	660	165	298	89	R2 or 2"NB Socket

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Comprising a group of highly experienced water treatment professionals, Water Process Solutions based in Kent, aims to consistently provide customers with the equipment and the support needed for effective and reliable process water treatment.

For further information, visit our web site:



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