

# Bellows Metering *Pumps*

Bellows metering pumps operate on a positive displacement principle. Pumps are designed to displace both corrosive and noncorrosive fluids. Accurate to  $\pm 0.5\%$  from stroke to stroke, when pump is set 50% to 100% of full stroke. Discharge pressure is maintained over the entire flow range of the pump. Poppet valves are utilized to prevent backflow; and springs are available to provide a positive shutoff, preventing siphoning through the pump in applications where a positive suction head exists.

Typical applications include film and x-ray processors, silver recovery systems, wafer and silicon chip washers and processors, detergent dispensers, blood analyzing equipment, industrial floor scrubbers, thermo therapy equipment, waste removal systems, and wastewater and water treatment systems.

## Features:

- Repeatability from stroke-to-stroke to  $\pm 0.5\%$
- Dry run capability
- Self-priming
- No dynamic seals
- Corrosion resistant
- Long, maintenance-free operation



**2 1/2" STANDARD MODEL**



**1 1/2" HEAVY-DUTY MODEL**

## Bellows Metering Pump Operation:

The Bellows Metering Pumps operate on a positive displacement principle. The rotation of the motor shaft is transmitted into an up and down motion through a lever pivot crank mechanism. This motion provides a continuous squeezing and relaxing force on a bellows module, forcing fluid in and out of the module. Discharge pressure is maintained over the entire flow range of the pump.

## Optimum Operating Conditions:

Optimum operating conditions consists of a 6" minimum suction lift and a discharge head of not less than 6". Pumps must be mounted vertically with the valve body at the top to obtain maximum metering accuracy.

## Flow Rate and Discharge Pressure:

The flow rate of each bellows module is regulated by three factors:

1. Diameter of the bellows,
2. Speed of the gearmotor, and
3. Adjustment of the module stroke length.

Bellows are available in four different diameters.

The full stroke displacement and discharge pressure of the pump is dependent on the size of the bellows as shown below:

Size	½"	1"	1½"	2½" STD	2½" BOJ
Full Stroke Displacement in ml	.5	5	10.5	55	27.5
Maximum Discharge Pressure (psi)	50	40	20	5	5

BOJ - BEL O JUST® STD - Standard

## Flow Adjustment:

The flow rate of all bellows pumps can be adjusted by modifying the length of the discharge stroke. Adjustments can be made down to 10% of full stroke on all models except ½" models which are limited to 20% of full stroke. Two styles of adjustment mechanisms are available.

**Note:** Best priming and metering accuracy occurs when the stroke length is 50% or greater.

**Standard Crank** — Adjustment cannot be made while pump is operating. An adjusting screw changes the stroke length of an eccentric crank.

**BEL O JUST®** — Can be adjusted while the pump is operating. A knob regulates drive arm motion which modifies the stroke length of the bellows module.

## Pump Specifications:

**Flow Rates** — Range from 3.9 ml/min to 3000 ml/min, depending on pump configuration, gearmotor speed and stroke length.

**Discharge Pressures** — Range from 5 to 50 psi depending on bellows size.

**Fluid Temperature** — To 140°F (60°C)

**Note:** Reduce pressure rating by 50% for fluid temperatures over 120°F (49°C).

**Viscosity/Slurries** — Maximum fluid viscosity is 5,000 centistokes. Poppet valves can handle fine slurries. Duckbill valves are recommended for heavy slurries or fibrous materials. **Heavy slurries should be flushed from the pump before shutdown.**

## MAXIMUM DRY AND WET PRIMING SPECIFICATIONS

Feet (Meters)

Bellows Size	Dry Prime 50% of Full Stroke	Dry Prime 100% of Full Stroke	Wet Prime 50% of Full Stroke	Wet Prime 100% of Full Stroke
½"	2.50 (.76)	8.67 (2.64)	5.83 (1.78)	17.17 (5.23)
1"	3.08 (.94)	8.33 (2.54)	6.25 (1.91)	14.25 (4.34)
1½"	4.33 (1.32)	11.00 (3.35)	9.58 (2.92)	20.58 (6.27)
2½"	9.17 (2.80)	18.50 (5.64)	15.25 (4.65)	27.58 (8.41)

## Gearmotors:

Catalog gearmotors are available in 115V, 50/60 Hz or 240V, 50/60 Hz. Standard motor speeds are 39, 60, 90 and 165 RPM at 60 Hz. Motors are UL listed and continuous duty rated with a minimum life expectancy of 2000 hours. Perpetual running of motor is not recommended. If a non-stop application is encountered, the Gorman-Rupp Industries Heavy-Duty Bellows Metering Pump is recommended.

## Materials in Contact with Solution:

**Connectors** — Polypropylene

**O-Rings (Elastomers)** — EPT/EPDM, Hypalon®, or Viton®/Fluoroelastomer

**Poppet/Duckbill Valves** — EPT/EPDM, Hypalon®, or Viton®/Fluoroelastomer

**Bellows** — Standard Polypropylene Materials  
Additional materials available, refer to OEM Section.

## Pump Selection:

Select a bellows size that meets your pressure requirements. Select a model with the bellows size that provides your required flow while operating closest to full stroke capacity. Best metering accuracy occurs when bellows modules operate at 50% or more of maximum output. For 24 hour continuous duty service, use one of the heavy-duty models.

Select a valve and O-ring combination and tubing connectors for each bellows from the selection charts at the end of this section. Specify duckbill valves if heavy slurries or fibrous materials are being pumped. Refer to the Chemical Resistance Section to help determine compatibility.