How Progressing Cavity Pumps work:

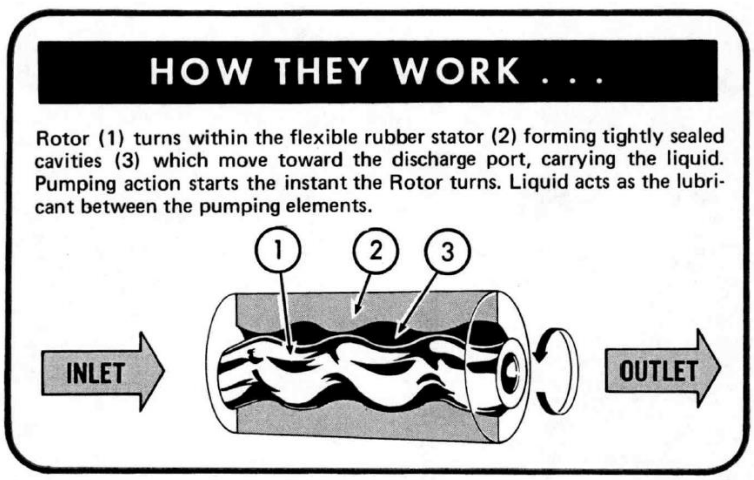
Progressing Cavity Pumps have similar characteristics of a Piston Pump, such as sealed cavities and operational similarities such as: being able to pump at extremely low rates, even to high pressures, and revealing the effect to be purely positive displacement.

They are also known as an Eccentric Screw Pump due to the motion of the rotor.

Rotors are made of Hardened Steel or Stainless Steel and are covered with a Chrome Plating to give resistance to corrosive and abrasive materials. Some liquids affect the Chrome Plating and in those applications a Non-Plated Rotor should be used.

Stators are metal tubes with internally molded cavities of Synthetic or Natural Rubber.

The Rotor seals tightly against the flexible rubber stator as it rotates, forming tightly sealed cavities which move toward the discharge port, carrying the liquid. The pumped liquid does not change in shape or size when pumped due to the tightly sealed cavities formed between the rotor and stator. The effect of the design is that the fluid is moved at a very predictable and steady rate. With positive suction the pumping action starts the instant the Rotor turns. Liquid acts as the lubricant between the pumping elements.



In operation our pumps are fundamentally fixed flow rate pumps and offer long life and reliable service transporting thick or lumpy fluids. However, abrasive fluids can significantly shorten the life of the stator. Also, slurries can be pumped reliably if the slurry is viscous enough to maintain a lubrication layer around the particles and protect the stator.

At the points where the rotor touches the stator, the surfaces are generally traveling transversely, so small areas of sliding contact occur. These areas need to be lubricated by the fluid being pumped. This can mean that more torque is required for starting, and if allowed to operate without fluid, called “run dry”, rapid deterioration of the stator can happen as a result.

Progressing Cavity Pump key advantages:

POSITIVE DISPLACEMENT
The turning ROTOR develops "positive pumping action" similar to a piston moving through a cylinder of infinite length. The pump pressure developed does not depend upon the speed of the rotating ROTOR. The capacity of the pump is approximately viscosity, and pressure can be projected for particular operating conditions.

UNIFORM DISCHARGE FLOW
Fluids are uniformly discharged without pulsation in a constant steady flow. Displacement remains the same with each revolution of the ROTOR permitting accurate predictable metering relative to the fluid being pumped. Because of the unique flow characteristics, these pumps are well suited for low-shear applications.

INTERNAL VELOCITY OF FLUIDS
All fluids are pumped with a minimum amount of turbulence, agitation, pulsation or separation disturbance.

SELF PRIMING
Pumping action starts at the time the ROTOR is turned and it is capable of 28 feet of suction lift in an appropriate installation. The liquid being pumped acts as a lubricant between the ROTOR and STATOR and forms a continuous seal to project the pumping phenomena.

SOLIDS IN SUSPENSION
Solid particles over a wide range of size and shape - as large as 1 1/8 inches in diameter, are pumped with no difficulty.

REVERSIBLE
Pumps can be operated clockwise or counter-clockwise with effective performance in most installations.

INSTALLATION
Pumps can be mounted horizontally or vertically and the Suction Port can be turned to any position for appropriate entry of the liquid.

Pump Selection Guide

To properly select the best performing pump consideration should be given to:

Capacity

The rate of flow in Gallons Per Minute (GPM).

Pressure

How much Pressure is required to move the Liquid being Pumped thru the Discharge Port of the Pump depends upon the piping system and the kind of Liquid being handled. The difference between the Pressure required at the Pump Discharge and the pressure being introduced into the Pump Suction is the differential Pressure and is expressed as Pounds Per Square Inch- (PSI).

Viscosity

The resistance to the flow is expressed by various Scales of measurement; however, the most commonly used is CENTIPOSES. The Viscosity usually changes with Temperature and should always be considered. For conversion purposes the formulas set forth below can be of value:

Centipoises = Centistokes x Specific Gravity

Centipoises $= \frac{SSU}{5}$ x Specific Gravity

(SSU= Saybolt Seconds Universal)

Temperature

The Maximum and Minimum Temperatures at which the Fluid to be pumped are important factors in proper Pump Selection. High Temperatures can cause distortion and swelling of Stator Materials and Low Temperatures can affect Viscosity that reflects in Flow Characteristics and Horsepower requirements.

Operating Time

The Operating Cycle of the Pump should be considered; Whether the Pump is to run continuously or intermittently can be a factor in the selection of the Drive.

Abrasion

Classify the Abrasive characteristics of the fluid to be pumped. Abrasives can look alike and appear to have similar properties; however, they can produce different wearing characteristics. Endeavor to classify the fluid broadly in order to select the proper Pump Construction and Operating Speed. The Classifications set forth below will serve as a guide and our experiences will be helpful:

No Abrasives

Example: Clear Water, Gasoline, Fuel Oil, Lubricating Oil.

Light Abrasives

Example: Dirty Water containing Silt and/or small amounts of Sand or Earth.

Medium Abrasives

Example: Clay Slurries, Potters Glazes, Porcelain Enamel, Frit, Sludge, Wood Dust in Water.

Heavy Abrasives

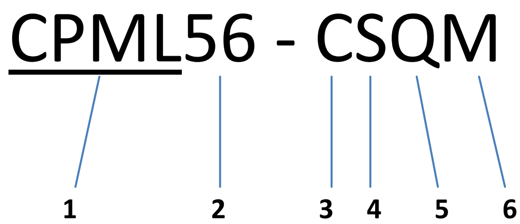
Example: Slurries containing large amounts of Sand, Emery Dust, Lapping Compounds, Mill Scale, Plaster, Grout, Roof Gypsum.

Corrosion

Whether the Fluid being pumped is Neutral, Acid or Alkaline it should be considered in selecting the proper materials of Pump construction. The pH value of the Fluid should be known or determined. A pH of 7 is neutral, below 7 is Acid and above 7 is Alkaline.

CP Model Number Identification:

Materials used in the pumps are based on the fluid to be handled and are indicated in the model number identification.



(1): Indicates the type of pump

(2): Indicates the pump frame size designation

(3): Indicates the pump body casting material

(4): Indicates the rotor material

(5): Indicates the stator material

(6): Indicates the type of seal

Material of Construction

	Continental Letter Key	Materials
Pump Body	C	Cast Iron
	S	316 Stainless Steel
Rotor	S	Chrome Plated 304 Stainless Steel
Stator	Q	Buna Nitrile
	R	Natural Rubber
	B	EPDM
	F	Viton
Seal Type	M	Mechanical Seal
	D	Packing Gland

CL, CM and CG Model Number Identification:

Materials used in the pumps are based on the fluid to be handled and are indicated in the model number identification.

2CL8 - CDQ

1 2 3 4 5 6

(1): Indicates the number of stages for the rotor and stator

(2): Indicates the pump frame size designation (CL, CM or CG Frame)

(3): Indicates the size of the rotor and stator

(4): Indicates the pump body casting material

(5): Indicates the rotor and internal parts material

(6): Indicates the stator material

Material of Construction

	Continental Letter Key	**Materials**
Pump Body	C	Cast Iron
	S	316 Stainless Steel
Rotor	D	Chrome Plated Alloy Steel
	S	Chrome Plated 304 Stainless Steel
Stator	Q	Buna Nitrile
	R	Natural Rubber
	B	EPDM
	F	Viton
Internal Parts	C	Carbon Steel
	AF	Anti-Friction Bearings
	HS	Hardened Steel

Frame Size Designation

CL- Suitable for a wide variety of applications and are the most frequently used. When properly applied they give excellent long life performance at the most economical cost.

CM- Similar to CL Pumps, except have a larger drive head to handle the increased horsepower that is needed to produce the higher pressures that can be developed by these pumps.

CG- Designed to handle the heavier applications of Sewage, Industrial Waste, Polluted Liquids and Slurries.

Liquids that can be handled by Continental Progressing Cavity Pumps

These Materials of Construction permit Continental Pump to handle almost any fluid that can be moved thru pipe. Set forth in the accompanying chart is a partial list of liquids that have been successfully handled along with an indication of the basic materials for the pump body, the rotor and the stator.

Rotors are made of Hardened Steel or Stainless Steel and are covered with a Chrome Plating to give resistance to corrosive and abrasive materials. Some liquids affect the Chrome Plating and in those applications a Non-Plated Rotor should be used.

Stators are metal tubes with internally molded cavities of Synthetic or Natural Rubber.

Note: *Non-Plated Rotor

When 'D' Rotors are used the Drive Shaft and Connecting Rod will be Carbon Steel. When 'S' Rotors are used the Drive Shaft and Connecting Rod will be Stainless Steel. Maximum allowable Temperatures for Stators: B -240°F, F -300°F, Q -210°F, R -185°F

LIQUID	PUMP BODY		ROTOR		STATOR			
Acetic Acid (cold dilute)		S		S*	B		Q	R
Acetone	C	S	D	S	B			
Acid Mine Water	C			S			Q	R
Alcohol, Ethyl (grain)	C		D				Q	R
Alcohol, Methyl (wood)	C		D				Q	R
Alum (Paper mill)		S		S	B	F	Q	R
Aluminum Hydroxide	C		D				Q	R
Aluminum Sulphate		S		S	B	F	Q	R
Ammonium Bicarbonate	C	S	D	S	B			R
Ammonium Chloride		S		S*	B		Q	R
Ammonium Phosphate	C	S	D	S	B		Q	R
Ammonium Nitrate	C	S	D	S	B		Q	R
Ammonium Sulphate	C	S		S*	B		Q	R
Aromatic Hydrocarbons	C	S	D	S		F		
Asphalt	C	S	D	S		F		
Barium Chloride	C	S		S	B	F	Q	R
Barium Hydroxide	C	S	D	S	B	F	Q	R
Barium Nitrate	C	S	D	S			Q	R
Barium Sulphate	C	S	D	S			Q	R
Beer		S		S			Q	R
Beer Wort		S		S				R
Beet Sugar Liquor		S		S	B	F	Q	R
Benzene (coal tar product)	C		D	S		F		
Benzine (petroleum product)	C	S	D			F	Q	
Black Liquor	C	S	D	S		F	Q	
Boiler Feed Water	C		D				Q	
Bordeaux Mixture	C		D				Q	R
Boric Acid		S		S		F	Q	R
Brine, Calcium Chloride	C	S		S*	B	F	Q	R
Brine, Sodium Chloride	C	S		S*	B	F	Q	R
Calcium Chlorate	C	S	D	S		F		
Calcium Chloride	C	S	D	S	B	F	Q	R
Calcium Hypochlorite	C	S		S	B	F		
Calgon (sodium hexametaphosphate)		S		S			Q	R
Carbon Bisulfide	C	S	D	S		F		
Carbon Disulphide	C	S	D	S		F		

LIQUID	PUMP BODY		ROTOR		STATOR			
Carbonic Acid	C			S			Q	R
Castor Oil	C	S	D	S		F	Q	R
Caustic Potash (lye)	C	S	D	S			Q	R
Caustic Soda (lye)	C	S	D	S	B		Q	R
Caustic Zinc Chloride		S		S			Q	R
China Wood	C		D				Q	
Drying Oils	C		D				Q	
Vegetable Oils	C		D				Q	
Chlorinated Hydrocarbons								
Chloroform		S		S		F		
Dichloroethylene	C	S	D	S			Q	
Methyl Chloride	C	S	D	S		F		
Tri Chloroethyline		S		S		F		
Chromic Acid (diluted)		S		S		F		
Citric Acid		S		S	B	F	Q	R
Clay Slip	C		D			F	Q	R
Copper Nitrate		S		S			Q	R
Copper Sulphate		S		S*		F	Q	R
Copperas		S		S*			Q	R
Corn Oil	C	S	D	S		F	Q	
Cotton Seed Oil	C	S		S		F	Q	
Creosote	C	S	D	S		F	Q	
Cyanide	C		D				Q	R
Cyanide of Potassium	C		D		B	F	Q	R
Diethylene Glycol (alcohol)	C	S	D	S		F	Q	R
Distilled Water or Deionized	C	S		S			Q	R
Distillery Wort	C	S	D	S			Q	R
Edible Oils	C	S	D	S			Q	
Epsom Salts	C	S	D	S	B	F	Q	
Ethyl Alcohol	C	S	D	S	B	F		
Fatty Acids	C	S	D	S		F		
Ferric Hydroxide		S		S	B		Q	R
Ferrous Sulphate		S		S*			Q	R
Formaldehyde		S		S		F	Q	
Formic Acid		S		S		F		
Fruit Juices		S		S			Q	R
Fuel Oils	C	S	D	S		F	Q	
Furfural	C	S	D	S	B			
Fusel Oils	C		D				Q	
Gasoline	C		D				Q	
Glucose	C	S	D	S	B	F	Q	R
Glue	C	S	D	S	B	F	Q	R
Glycerine	C	S	D	S	B	F	Q	R
Glycerol	C	S	D	S	B	F	Q	R
Grain Alcohol	C		D				Q	R
Grape Juice		S		S			Q	R
Hops	C	S	D	S			Q	R
Hydrocyanic Acid		S		S	B	F		
Hydrogen Peroxide		S		S		F		
Hydrogen Sulfide		S		S	B	F		
Kerosene	C		D				Q	
Lard	C	S	D	S		F	Q	
Lime Water	C		D				Q	R
Linseed Oil	C	S	D	S	B	F	Q	
Lubricating Oils	C		D				Q	
Lye (sodium hydroxide)	C	S	D	S	B	F	Q	R
Magnesium Chloride	C	S	D	S	B	F	Q	R
Magnesium Sulphate	C	S	D	S*	B	F	Q	
Mercury	C	S	D	S			Q	R
Methanol	C	S	D	S	B		Q	R

LIQUID	PUMP BODY		ROTOR		STATOR			
Methyl Chloride	C		D				Q	R
Milk of Lime	C			S			Q	R
Mine Water	C			S			Q	R
Molasses	C		D	S	B	F	Q	R
Naphtha	C		D				Q	
Nickel Chloride		S		S	B	F	Q	R
Nickel Sulphate		S		S*	B	F	Q	
Oil - Paraffin Base	C		D				Q	
Oil - Vegetable	C		D				Q	
Paints - Water Base	C		D				Q	R
Palmitic Acid	C		D			F	Q	
Phosphoric Acid		S		S		F		
Potassium Carbonate	C		D				Q	R
Potassium Chloride	C		D		B	F	Q	R
Potassium Nitrate	C		D		B	F	Q	R
Potassium Phosphate	C		D				Q	R
Potassium Sulphate	C		D		B	F	Q	
Salammoniac		S		S	B		Q	R
Salt Brine (to 30%)	C	S		S			Q	R
Sea Water	C			S			Q	R
Sewage	C		D				Q	R
Shellac	C		D				Q	
Soap Liquor (thin)	C	S	D	S	B	F	Q	
Soda	C		D		B	F	Q	R
Sodium Aluminate	C		D		B		Q	R
Sodium Bicarbonate	C			S	B	F	Q	R
Sodium Bisulfite		S		S	B		Q	R
Sodium Carbonate	C			S	B	F	Q	R
Sodium Chloride	C	S		S*	B	F	Q	R
Sodium Hydroxide	C	S	D	S	B		Q	R
Sodium Nitrate	C		D		B			
Sodium Silicate	C		D		B	F	Q	R
Sodium Sulfate		S		S	B	F	Q	
Soy Bean Oil	C		D			F	Q	
Starch	C	S	D	S	B		Q	R
Steric Acid		S	D				Q	
Sugar	C		D				Q	R
Tar	C		D				Q	
Tar & Ammonia in Water	C		D				Q	
Titanium Chloride		S		S		F		
Toluene (toluol)	C		D			F		
Trub Sludge	C		D				Q	R
Turpentine	C		D			F	Q	
Varnish	C		D			F		
Vegetable Oil	C		D				Q	
Vinegar		S		S*	B	F	Q	
Vitriol - Blue		S		S	B	F	Q	
Vitriol - Green		S		S			Q	R
Waste Water	C		D				Q	R
Whiskey	C	S	D	S			Q	R
Wine		S		S	B		Q	R
Wood Pulp	C		D				Q	R
Yeast		S		S	B		Q	R
Zinc Chloride		S		S*	B	F	Q	R
Zinc Nitrate		S		S			Q	R
Zinc Sulfate		S		S*	B		Q	R

Note: * Non-plated ROTOR.
When D ROTORS are used the Drive Shaft and Connecting Rod will be of Carbon Steel.
When S ROTORS are used the Drive Shaft and Connecting Rod will be of Stainless Steel.
Maximum allowable Temperatures for STATORS: B - 240° F, F - 300° F, Q - 210° F, R - 185° F.

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