

# Canned Motor Pumps

For zero-leakage operation in applications that demand robust and reliable performance



## **CANNED MOTOR PUMPS**

# The safest pumping solution for your plant.

Hayward Tyler canned motor pumps offer the safest and most environmentally friendly pumping solution for your plant or process by utilizing two layers of protection (secondary containment). Unlike traditional pumps, canned motor pumps are completely sealless, eliminating the need for mechanical seals and ensuring leak-free operation.



## Industries

With their reliable performance and sealless design, canned motor pumps are utilized across a wide variety of industries. They are the preferred choice for applications where safety, equipment up-time and environmental concerns are paramount.



Petrochemical



**Chemical Refinement & Processing** 



Hydrogen / Clean Energy



Refrigeration



Renewables



Nuclear

## Why choose a CMP over other options?

## CANNED MOTOR PUMP vs. MECHANICALLY SEALED PUMP





## **No Mechanical Seals**

Faulty seals can leak, causing process shutdown upon failure. Sealless canned motor pumps eliminate this issue.

## Low Maintenance

No motor and pedestal bearing lubrication levels to be continually monitored and maintained.

## Single Motor & Pump Combination

There is no need for hot or cold alignment, and no special foundation is required due to the reduced weight of canned motor pumps.

## **Reduced Noise Levels**

Noise sources are greatly reduced with canned motor pumps due to internal fluid dampening while not requiring cooling fans.

## Eliminates Emissions Inspections & Reporting

Since canned motor pumps cannot leak, costly and time-consuming government and company emission monitoring and recordkeeping reporting are not required.

## CANNED MOTOR PUMP vs. MAGNETIC DRIVE PUMP



## Secondary Containment as Standard

Secondary containment—a standard in CMPs protects the environment from potential leaks even in the event of equipment failure. Magnetic drive pumps do not have secondary seals, and if added are susceptible to the same problems of primary seals. Dual skin cans in magnetic drives add to losses and their reliability is not proven.

## **No Foundation Required**

As they weigh less than magnetic drive pumps, no special foundation is needed.



## **Only Two Low-Maintenance Bearings**

Pedestal-mounted mag drive pumps have a minimum of six bearings that must be checked frequently, making maintenance and monitoring more difficult than canned motor pumps.

### **Reduced Noise Levels**

Many sources of noise are absent in canned motor pumps, with no cooling fans, flexible couplings, rolling element bearings or pedestal assemblies.

## **Reduced Repair Costs**

Studies have shown that canned motor pumps have lower total life cycle costs than magnetic drive and mechanically sealed pumps.

# **Operating Range**

We have a wide range of standard pumps, allowing us to offer competitive leads times. We can extend the boundary and offer custom solutions to meet your needs. We pride ourselves on working with our customers to find the solutions that work for their applications.

Parameters	US	SI
Flowrate	2–11,500 USgpm	0.5–2600 m³/hr
TDH	12–1970 ft	4–600 m
Power	Up to 600 hp	Up to 450 kW
Temperature	-160 to 750 °F	-110 to 380 °C
Design Pressure	6000 psig	42 Mpa
Viscosity	0.07–140 cps	0.07–140 mPa-s
Materials	Most Common	Alternatives
In Contact with Fluid	304, 316SS	316L, Hastelloy, Titanium, others as required
Winding Insulation	Class 200	Class H (180 °C), Class 220, Class 400
Gasket	PFTE, metal spiral wound	Matched to any wetted material
Bearings	Carbon Graphite, Silicon Carbide	PEEK, others as required
Standards	Factory standard, ISO 2858, API 685, other international standards	
Hazardous Location Certification	ATEX Directive, UL and CSA certifications available	



## Performance Curves

### (m) 50 Hz 500 (100-80DM) Multi-stage 2 pole 80-65CM 125-100DM 300 50-40BM $\overline{Z}$ 40-25BM Single-stage 2 pole 200 Single-stage 4 pole 80-50F 100 125-100F Total Head 150-125F 65-40E 100-80F 70 (65-50E) 80-65E 100-80E 250-200J) 125-100E 150-125E Z 50 40-25D 250-200H -50-40D 65-50D 80-65D 100-80D 200-150G 125-100D 30 (65-50C) 40-25C 50-40C 100-80C 150-125F 80-65C 20 200-150F 300-250FD 40-25B 50-40B 65-50B 80-65B 10 125-100D 7 1000 (m<sup>3</sup>/hr) 5 7 10 20 30 50 70 100 200 300 500 700 3 Capacity





### 3480/1740 rpm

## **GAS SEAL SLURRY PUMP**



## **SELF-PRIMING PUMP**



2900 – 3480 rpm

## SECTIONAL DIAGRAM

## Canned Motor Pump Structure

We offer a variety of standard motor frame and pump hydraulic combinations to match your system need. This allows for cost optimization and industry leading delivery times.

## **Stator Windings**

OUR

3-phase induction motor. Encapsulated with solid resin or nitrogen.

### Flanges

Flanges available to major international standards, including DIN, EN, ANSI, ASME, JIS, and GB. Designed for 2x API nozzle loads.

## **Thrust Balanced**

Automatic axial thrust balancing removes the need for a large thrust bearing

### Impeller

Designed for high efficiency and low NPSHr. Available with an inducer for low NPSHa applications

## **Dual Containment**

Two levels of containment against leakage. Motor can be designed to follow API685. Safety and reliability come as standard with Hayward Tyler Canned Motor Pumps.



## **Bearing Wear Indicator**

- Detects and indicates bearing wear
- Shows wrong rotating direction

## **Monitoring options:**

- Local monitoring
- Remote panel mounting output
- Connect to existing PLC or DCS through 4-20 mA digital signal

### **Robust Wear Components**

Radial bearing, shaft sleeve and thrust collar available in a variety of materials to suit the applications

Bearing: SiC, CG, PTFE

Shaft Sleeve and Thrust Collar: SiC, Stellite, Hardened Chrome, WC

## **SECTIONAL DIAGRAM**

## Instrumentation Options



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## **JE: Power Monitor**

**Function:** Indication or alarm/shutdown on abnormal power due to running, excess load, or single phasing. This is attached at your switch gear.

## STANDARD

## **RE: Rotation Monitor**

**Function:** Indication on motor rotation direction



## **ZE1: Bearing Radial Wear Monitor**

Function: Indication or alarm/shutdown on bearings radial wear

## **PE: Pressure Monitor**

**Function:** Shutdown on rising pressure due to containment shell leakage

### STANDARD TE1: Motor Thermal Protection

**Function:** Alarm shutdown on excessive temperature in windings due to loss of circulation fluid or over load

### **ZE2:** Axial Shaft Position Monitor

**Function:** Indication or alarm/shutdown on excessive change in axial shaft position

## **TE2: Temperature Monitor**

**Function:** Indication or alarm/ shutdown on increasing temperature on circulation flow path

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## HV Hollow Shaft API685 PLAN 1-S

Basic canned motor pump design using a hollow shaft for inner circulation.



## HP Standard API685 PLAN 13-S

Solid shaft construction with an external recirculation line for cooling.



## HZ Self-Priming API685 PLAN 1-S

Has a chamber that allows for self priming. Particularly suitable for pumping from underground tanks and applications with entrained gases.



# Reverse Circulation

API685 PLAN 13-SE

Uses a reverse circulation flow path and is self-venting. Suitable for fluids with a low vapor pressure.



## HW Vertical Reverse Circulation API685 PLAN 13-SE

Vertical orientation, reverse circulation. Typical applications include liquefied gases (LPG, CO<sub>2</sub> etc.) and refrigerants (Ammonia, etc).





## HS Slurry Handling API685 PLAN 53-S & 54-S

An internal mechanical seal allows the handling of fluids with a small amount of fine particles.







## нл на Slurry Handling with Gas Seal

API685 PLAN 53-S & 54-S

Vertical design with the ability to handle solid content up to 30%wt. The design uses and internal mechanical seal and a gas chamber between the pump and motor for isolation.





PLAN 53-S



PLAN 54-S

## нт High Temperature API685 PLAN 23-S

Thermal barrier between the pump case and motor to thermally isolate the motor. Suitable for high temperature applications including hot oils and hot water. External heat exchanger keeps the motor temperature regulated.





## HV-X High Temperature API685 PLAN 1-S

Excellent for high temperature applications where no cooling water is available. Non-organic insulation materials allow for higher motor operating temperatures.



## hr High Melting Point Api685 plan 1-s

Uses a series of heating jackets to maintain an increased temperature around the motor. Ideal for handling liquids with high melting points.



## ня-у High Temperature, High Melting Point

API685 PLAN 1-S

Similar to model HR, with a key difference in its ability to handle higher motor temperatures.





## HP-M

# Basic Circulation Multistage

For applications requiring high head for the process while maintaining zero leakage.



## HN-M Reverse Circulation Multistage API685 PLAN 13-SE

Similar multistage pump design for fluids with low vapor pressure.



## нр-т Tandem Multistage

The offset multi-stage design is suited for the highest head applications. It uses a rigid shaft to minimize deflection.



## ADDITIONAL CANNED MOTOR PUMP TYPES

## не Submersible Туре

Submerged pumps can be mounted directly into tanks offering space savings.

They are most frequently used with liquefied gases or flammable liquids within gas plants, tank farms, chemical transportation and other industrial processes.



## нх Small Circulation

Designed for use in cooling fluid circulation systems such as inverters, transformers and small package equipment.

They are frequently used in wind turbines, locomotives and high voltage power transformers.





A High Pressure Butanediol Pump



Vinyl Chloride Monomer Pump used in manufacturing of PVC.





Pumping a Caustic Solution. Our canned motor pump eliminated a seal leak that was occurring every 3 months.

Steam Generator Start-up Pump for Concentrated Solar Plant

## Typical fluids handled by Hayward Tyler **Canned Motor Pumps**

### Α

Acetaldehyde Acetic acid Acetic anhydride Acetone Acetone cyanohydrin Acetonitrile Acrolein Acrylamide Acrylonitrile Alkylbenzenes Allyl acetone Allyl chloride Aluminum sulfate Amidol Ammonia water Ammonium copper acetate Ammonium sulfate Ammonium sulfide Ammonium sulphite Amyl acetate Anhydrous ammonia Anhydrous hydrogen chloride Anhydrous hydrogen fluoride Anhydrous sulfur dioxide Aniline Anol

### В

Benzaldehyde Benzene Boiler feed water Boric acid Butadiene Butane **Butanol** 

### С

Calcium chloride Calcium hydroxide Caprolactam

Carbon disulfide Carbon tetrachloride Caustic potash Caustic soda Chloroform Chloroprene Chlorosulfonic acid Chromic acid Cooking oil Cresol Crotonaldehyde Crude oil Cyclohexane Cyclohexanol

### D

Demineralized water Detergents Developers Dichlorobenzene Diethyl aluminum chloride Dimethyl formamide Dowtherm

### E

Ethanol Ethanol amine and other amines Ethyl acetate Ethyl ethers Ethylene dichloride (EDC) Ethylene oxide

F.

Fatty acid Fermentation solution Formaldehyde Formic acid Freon Furfural

## G

Gasoline Gelatine

Glycerine Ethylene glycol

### н

Т

Κ

L

Lactic acid

Lactonitrile

Liquid ammonia

Liquid chlorine

Liquid ethylene

Liquid methane

Liquid propane

Liquid propylene

Lithium bromide

Lithium chloride

Liquified ammonia

Liquid carbon dioxide

KC

Hexane Hexanol Hexanone Hvdraulic acid Hydrazine Hydrocyanic acid Hydrofluoric acid Hydrogen peroxide

Isopropyl alcohol

### Μ

LPG

Lubricants

Maleic acid Mercury Methacrylic acid Methanol Methyl acetate Methyl acrylate Methyl chloride and other coolants Methyl ether ketone Methyl ethers

Methyl hydrazine Methyl methacrylate Methyl naphthalene Methyl silane Methyl sulfoxide Methylene chloride Mixed acids Mobiltherm and other heat transfer media

## Ν

Naphtha Naphthalene Nitric acid Nonane

### 0

Octyl alcohol Oleic acid Oxalic acid

## Ρ

PAC Paints Petroleum (Naphtha, Crude Oil, Gasoline) Phenol Phosgene Phosphoric acid Phosphorus oxychloride Phosphorus trichloride Plasticizers Potassium bichromate Potassium hydroxide Propionic acid Propylene dichloride Propylene glycol Propylene oxide PVA **PVC** Pyridine S

Sea water Silane

Silicochloroform Silicon tetrachloride SK oil Sodium carbonate Sodium chlorate Sodium chloride Sodium cyanide Sodium hydroxide Sodium hypochlorite Sodium silicate Sodium sulfide Stearic acid Styrene Sulfurous acid Sulphuric acid Syrups

### Т

TDI Tetrachloroethylene Tetraethyl lead Titanium tetrachloride Toluene **TPA slurry** Transformer oil Trichloroethylene Triethyl aluminum silane

## ۷

Various catalyst slurry Various polymer slurry Various solvents Vinyl ether

### W

Waste water and other types of treated water

### Χ

**Xylene** 



## **Our Global Facilities**

We have manufacturing facilities across the globe to provide reliable and timely support to our customers.

Each location offers repair services and field service support capable of providing technical expertise to you, no matter where your location. Additionally, we have a network of partners across the globe to allow us to provide the most convenient options for your aftermarket support. We offer a wide range of repair options for all planned and predictive maintenance cycles, as well as comprehensive electrical and mechanical inspection capabilities.

Our field service support teams can be used on a supervisory or turnkey basis. With turnkey growing in popularity as an effective means of reducing staff overhead, Hayward Tyler is there to meet industry needs.



For further information on Hayward Tyler's Canned Motor Pumps, please contact us at a location below:



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