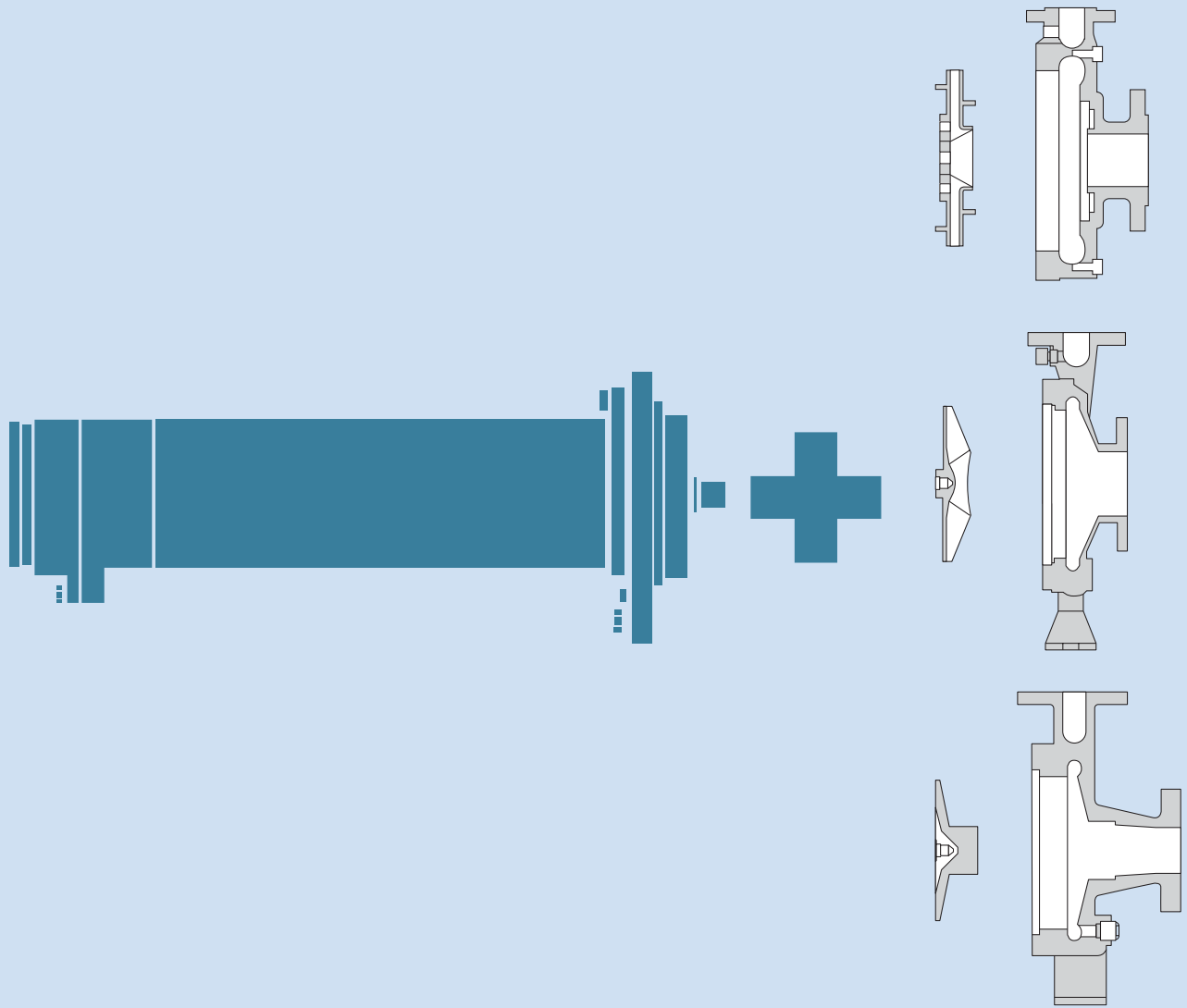


# CANNED MOTOR RETROFIT



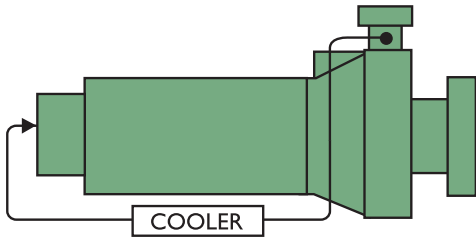
## Canned Motor Retrofit - Stops the leaks

Converting sealed and sealless pumps to Canned Motor Pumps in the Chemical, Petrochemical, Power, Nuclear, Military, Aerospace and Industrial markets.

- Mounts to your choice of pump OEM
- Epoxy encapsulated to ensure safety
- Double acting thrust bearing
- Efficient design
- Interchangeable modular design
- Multiple containment for zero leakage
- Rugged, reliable & safe
- Additional designs available

[www.haywardtyler.com](http://www.haywardtyler.com)

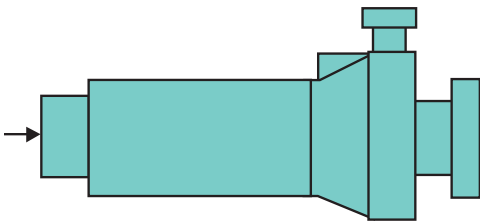
## Additional Containment Systems



### CMR™ System 02

Pumping Fluid Compatible with motor & high vapor pressure

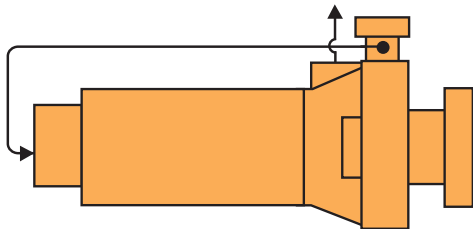
Same as the SYSTEM 01 but with precooling of high vapor pressure, above ambient temperature fluids.



### CMR™ System 04

Pumping Fluid Incompatible with motor – Backflush system

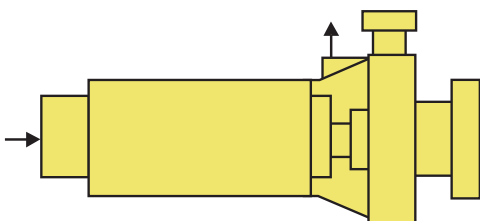
Back flush motor with a suitable fluid for applications where the pumped fluid is not compatible with the motor.



### CMR™ System 05

Pumping Fluid Compatible with motor, Volatile, & under 285°F

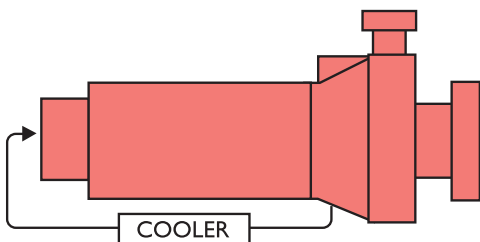
Internal restriction bushing and return to discharge or suction vessel builds internal pressure for use on volatile fluids.



### CMR™ System 07

Pumping Fluid Incompatible with motor – Customer supplied coolant system

Similar to SYSTEM 06 but with motor fluid supplied by the user.



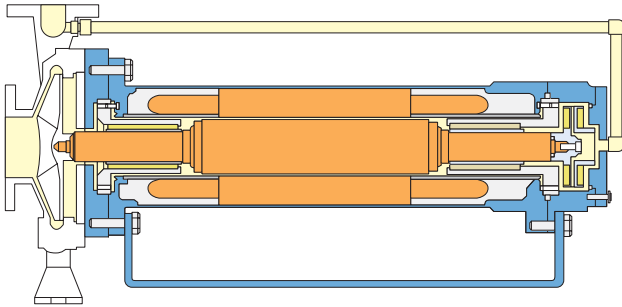
### CMR™ System 08

Pumping Fluid Incompatible with motor & from 350-850°F

Similar to SYSTEM 03 but with a thermal Barrier (Hot Neck) and heat exchanger for extremely high temperature pumped fluids and Hot Oil applications.

## Zero Leakage Solutions

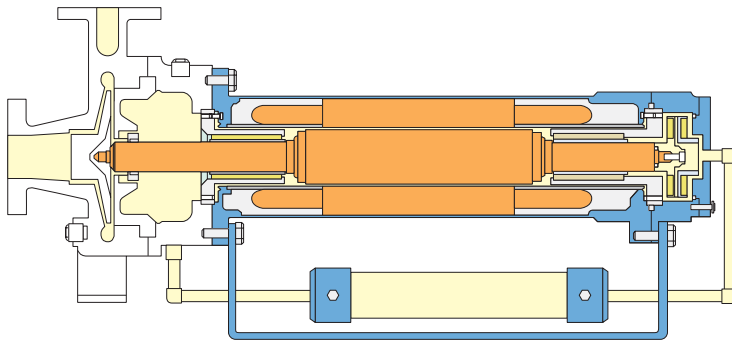
- Containment systems ensure no leaks even in the rare event of equipment failure.
- All **CMR™** systems incorporate our standard thrust bearing/auxiliary impeller for positive axial positioning and load bearing capacity. Even during system upsets, the rotor is properly located ensuring superior performance.
- No seal maintenance.
- Single shaft design requires no alignment.



### CMR™ System 01

Pumping Fluid Compatible with motor & under 285°F

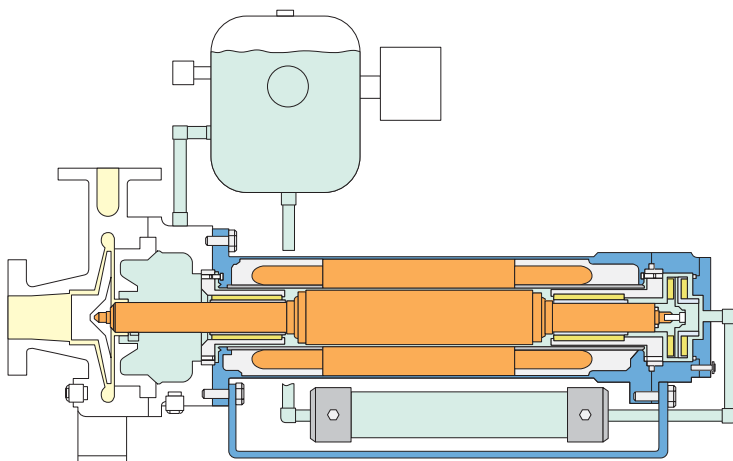
A small portion of the pumped fluid circulates from the pump discharge to the back of the motor, through the motor, and into the back of the pump impeller; lubricating the bearings and cooling the motor. Flow is controlled by a fixed orifice, optimizing fluid stream conditions and thrust loads over the entire performance range of the pump.



### CMR™ System 03

Pumping Fluid Compatible with motor & from 285-350°F

A separate motor/buffer fluid system is isolated from the pumped fluid by an internal flow restriction device, protecting the motor from corrosive, steep vapor pressure, or high solids content pumped fluids. This system can run "dry" indefinitely with the motor filled.

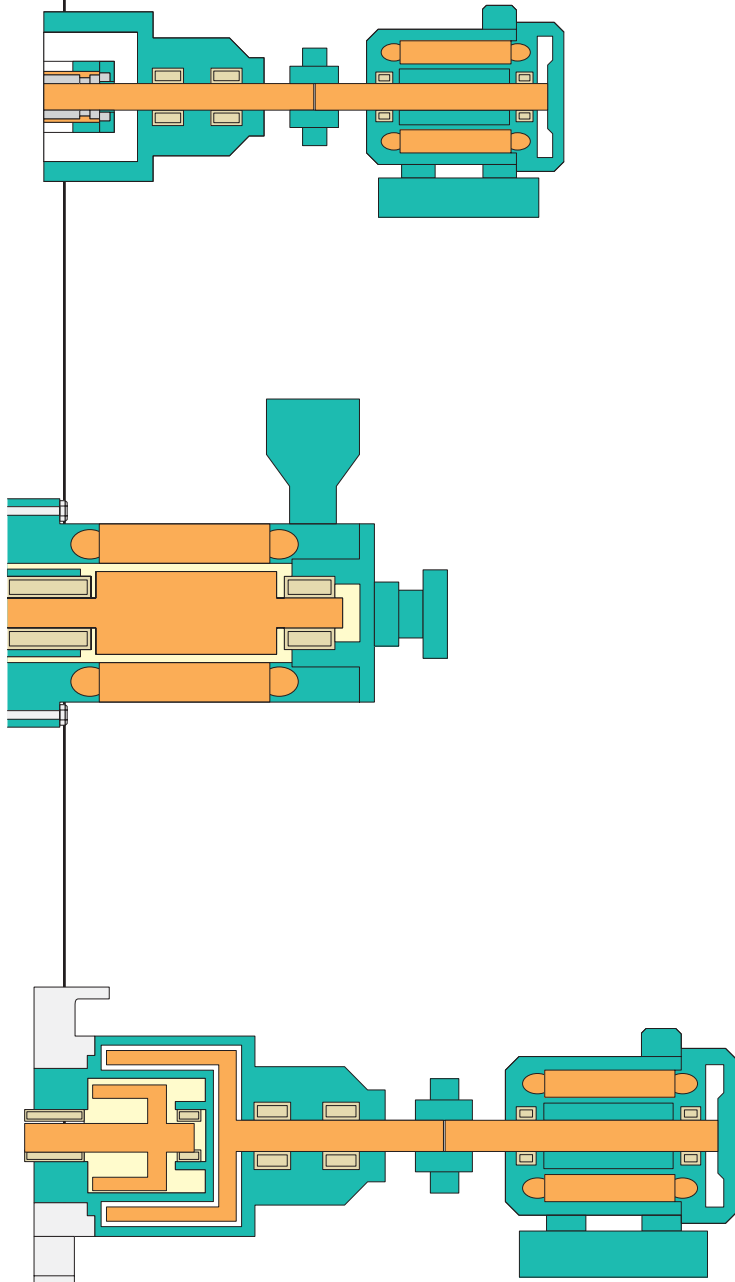


### CMR™ System 06

Pumping Fluid Incompatible with motor & under 350°F

A separate motor/buffer fluid system is isolated from the pumped fluid by an internal flow restriction device, protecting the motor from corrosive, steep vapor pressure, or high solids content pumped fluids. This system can run "dry" indefinitely with the motor filled.

## Problems Solved by Upgrading to a Hayward Tyler CMR™



### Sealed pumps

- Leak.
- May not meet emissions regulations even when functioning properly.
- Leakage increases dramatically on failure.
- Failures are unpredictable.
- Require constant lubrication, maintenance and seal replacement.
- Require alignment procedures.

### Other canned motors

- Lack a hydrodynamic thrust bearing/auxiliary impeller making them unsuitable for auxiliary systems to cope with difficult applications.
- May not have secondary containment.
- Oil filled and vented units are especially dangerous.

### Mag drive pumps

- Do not have secondary containment.
- Catastrophic failures can lead to massive leakage.
- Are prone to de-coupling, particularly with viscous fluids.
- Require lubrication maintenance and accurate alignment.
- Cannot run dry, with solids or in marginal vapor pressure applications.

## 65 Years of Sealless Experience

Hayward Tyler has pioneered the development of Sealless Motor technology. We have been the leading producer of Sealless pumps and motors for high-pressure controlled circulation boiler systems worldwide since acquiring our first patent in 1940.

## CMP Canned Motor Pump

Hayward Tyler has developed a customizable CMP product line to meet the challenges of keeping your pump OEM design of choice, with additional engineered capabilities of 6000 PSI pressure, temperatures from cryogenic up to 1000°F, and services including lethal, corrosive, hazardous Div II, and solids.



## Typical Fluids

Anhydrous Ammonia (High Volatility)  
Benzene (Volatile & Carcinogen)  
Caustics (Corrosive)  
Epichlorohydrin (Lethal)  
Formaldehyde (Carcinogen)  
Hot Oil (High Temperature)  
Liquid Gas (Low Temperature)  
Phosgene (High Volatility)  
Rad Waste (Radioactive)  
Styrene (Polymerizing)

## CMR™ Canned Motor Retrofit

The **CMR™** is the World's First Standard Canned Motor. Now **any** pump user can have the superior design features inherent in the Hayward Tyler Canned Motor. With its exclusive stepped pad type double acting thrust bearing, superior materials, auxiliary impeller and variety of circulation systems, the **CMR™** is the first canned motor which is **easily adapted to existing pump designs**.

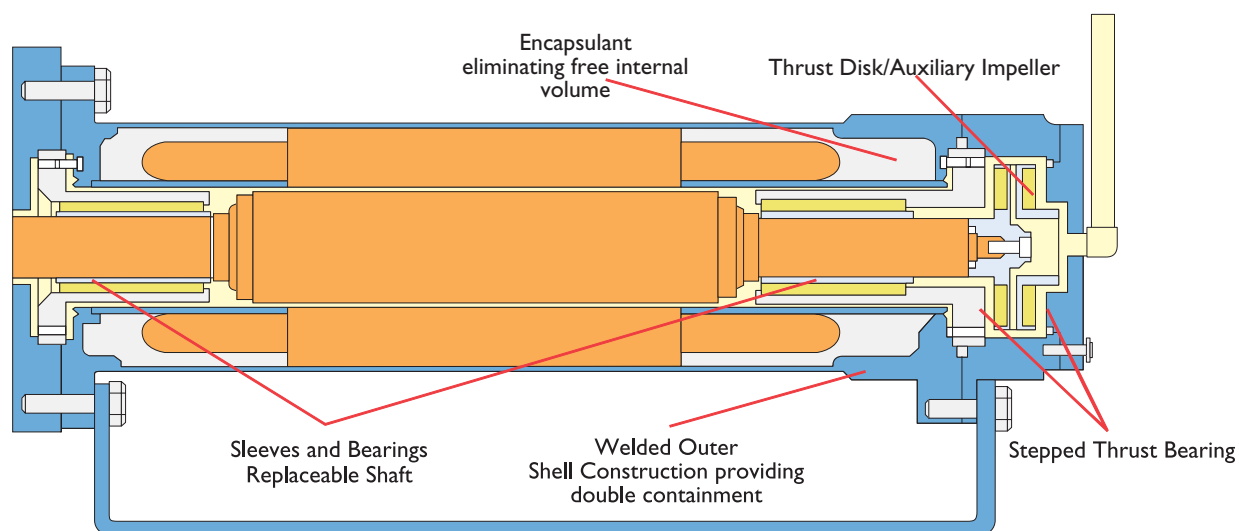
The **CMR™** sets the standard for reliability, ease of maintenance and zero leakage in canned motors.

Hayward Tyler's vast experience and applications expertise in sealless technology ensures a successful retrofit of an existing installed pump to the Hayward Tyler canned motor. Fluid stream properties within the motor are closely scrutinized by computer modeling to ensure adequate bearing lubrication and motor cooling. One of a number of auxiliary motor circulation systems can be utilized to solve the most difficult sealless pump applications. Hayward Tyler verifies each application, whether with an existing or a new pump end, with every fluid in every service.

## Typical Services/Uses

Condensate Circulation  
Debottlenecking  
Heat Transfer  
Fuel Pool Purification  
Rad Waste  
Reactor Circulation  
Safety Upgrading  
Spray Wash  
Stripper Feed  
Tank Unloading

## Hayward Tyler Canned Motor Design Features



### Mounts to your choice of pump OEM

The Hayward Tyler **CMR™** is a hermetically sealed motor, designed from the start to be compatible with the majority of pump ends used in the Process and Utility industries. Like all canned motors, the **CMR™** does not require a seal or packing. A small portion of the pumped or other fluid circulates through the motor, removing heat and lubricating the bearings before reentering the pump. The motor electricals are protected from the pumped fluid by welded Hastelloy C cans.

### Epoxy encapsulated to ensure safety

Hayward Tyler utilizes an inert, high thermally conductive epoxy to fill the stator cavity. A vacuum/pressure encapsulating process eliminates free internal volume in the stator cavity. This not only increases the winding life, but also prevents the accumulation of explosive or toxic vapors in the stator. Vents or expansion chambers, which are prone to damage and leaks, are not required.

### Double acting thrust bearing

Hayward Tyler offers the only sealless technology with a true, double acting, thrust bearing designed to take the full load of all **CMR™** applications. Incorporated into the thrust bearing design of every unit is an "auxiliary impeller" which increases internal pressure reducing the chance of liquid vaporization, and comprises the "heart" of our various circulation systems.

### Multiple containment for zero leakage

The Hayward Tyler **CMR™** does not rely solely on the "cans" to prevent leakage. A pressure rated leakproof lead wire/terminal feed through and welded stator shell provides secondary containment ensuring Zero Leakage.

### Rugged, reliable & safe

Designed with our vast experience in the Process and Utility industries, where reliability and safety are of paramount importance. A shaft critical speed well in excess of the operating speed is just one example contributing to the overall reliability of the **CMR™**.

### Interchangeable modular design

Utilizing one frame size for all the **CMR™** motors up to 72 horsepower provides complete interchangeability of the hydrodynamic parts, reducing the need for multiple spare parts. The entire unit can be disassembled in minutes into only 7 major components. Internal clearances can be quickly reestablished.

### Efficient design

The very high overall efficiency is achieved by optimizing the aspect ratio (length/diameter) to minimize fluid friction drag loss, utilizing copper rotor bars, and incorporating high quality electrical steel rotor and stator laminations.

### Additional designs available

- ASME Nuclear N-Stamped pumps for Section III, Classes 1, 2, 3
- Canned dry stator horsepower range up to 400 HP
- Wet (canned and uncanned) stator horsepower range up to 3000 HP
- Exotic materials available for difficult applications

