



Hayward Tyler first developed the Glandless (Sealless) pump motor in the early 1940's, and although there have been many refinements and design improvements since then, **we remain the leading supplier and the world's only specialist manufacturer of this type of equipment.**

We have supplied **more glandless pump motor units worldwide than any other single manufacturer.** Hayward Tyler's unprecedented reputation for quality and reliability, so vitally important for plant operation, **ensures our customers come back to us time and again.**

Hayward Tyler Glandless motor pumps are specifically designed to pump high pressure and high temperature water or other fluids (? Density). The key design element is a motor which can operate when full of the pumped medium which also provides cooling and lubrication. The pump is mounted on an extension of the motor shaft, without any form of dynamic mechanical seals, and the motor is subject to the same internal pressure as the pump but maintained at a relatively low temperature by a heat exchanger.

By eliminating mechanical seals, often the primary cause of failure of such pumps, Hayward Tyler pumps offer a very high degree of reliability.

All 3 pressure vessels (Pump, Motor and Heat Exchanger) are connected by flanged joints, creating one continuous pressure boundary, and as the pressure retaining joints are static, the pump can be designed to operate at very high pressures and temperatures.

## Key Features

- High-pressure units have only 2 main flange joints
- Tilting pad bearings
- Removable stator cartridge
- Only 1 external cooling water supply required
- No external filters needed
- Common pump / motor shaft eliminates any alignment issues

## Technical Advantages

### Tilting Pad Segmented Bearings

Hayward Tyler's tilting-pad journal bearing design is the result of years of continuous development and we believe it provides the most reliable and efficient system for product-lubricated bearings.

By virtue of its 6-pad design, the bearing has clear axial passages between each pad and its neighbour, which are washed by the internal motor circulation provided by the thrust bearing disk. The washing action prevents ferrous compounds such as magnetite being deposited on the bearings, which in turn ensures good lubrication and cooling, and a major contribution to a long bearing life.

### 2-Joint Constructions

For all high-pressure units, Hayward Tyler uses a 2-joint design, and the motor case is normally a one-piece forging, including the 'Hot Neck' and flange that connects to the pump. This means there is just one pressure-retaining flange between the pump and the motor, and one other flange for the motor end.

This system simplifies installation and maintenance, and only relatively short studs are required for each main flange, which are easily tightened to the correct torque using hydraulic tensioning equipment supplied with the pump.

### Cartridge Stator

The stators of Hayward Tyler high-pressure pumps are wound in a thin wall shell that is slotted into the high-pressure motor casing during assembly and easily removed for maintenance. This arrangement makes the stator much easier to work on, and if the operator wishes to stock a spare, this does not have to include the additional cost of a heavy pressure vessel.

### No Neck Cooler

The motor cooling system on Hayward Tyler pumps is fully integral, and there is no additional external cooling pipe work other than a simple 'in' and 'out' connection to the heat exchanger.



# Continuous Product Development

## Bearing Materials

Recognising that bearing technology is a key part of our products, Hayward Tyler continue to invest in new technology and materials, and have specific laboratory rigs to test bearing behaviour in adverse conditions that would not be encountered during normal operation.

## Terminal Glands

It is essential to have a reliable cable gland system to pass the power supply through the motor pressure vessel safely and reliably and, at the same time, ensure no leakage. Hayward Tyler have developed the terminal gland system over many years, and continue to develop the technology to handle pressures far in excess of the current design requirements for this type of pump.

# Applications

## Drum Boiler Circulation

Drum boiler circulation duties are some of the most arduous applications for Glandless Motor Pumps, but one where Hayward Tyler has excelled. Unlike start-up re-circulation pumps for once-through or supercritical boilers, the pumps on drum boilers must run continuously to maintain generation. Hayward Tyler pumps are renowned for running continuously, without fail, 24 hours a day, year in, year out - this is what makes them so special.

## Once-through Boiler Start-up Re-circulation

Hayward Tyler has produced pumps for start-up re-circulation for once-through boilers since the 1960's. Unlike drum boilers, the pumps do not have to run continuously, but higher design pressures and temperatures require careful design and special higher strength steels such as SA 182 F1 are used for the major pressure retaining parts.

## Economiser Re-circulation

Economiser re-circulation can be a desirable feature on a large boiler to improve temperature distribution and avoid stratification, or to increase flue gas temperature at low boiler load to ensure effective operation of selective catalyst reduction systems. Whatever the need, Hayward Tyler Glandless Pump Motor units can offer a solution.

## Primary and Secondary Nuclear Circulation

With a virtual leak-free design, Hayward Tyler Glandless Motor Pump Units are the ideal solution for both primary and secondary circulation duties on nuclear plants, and many such units are already installed in the UK and Scandinavia.

## Reactor Water Clean-up

Whilst the pressure and temperature rating required for Reactor water clean-up pumps duties may not rule out mechanical seal pumps, in practice this can be an arduous duty that only a Glandless unit can survive. Hayward Tyler have specially adapted designs of the basic glandless motor pump for reactor water clean-up duty.

## Motor Designs

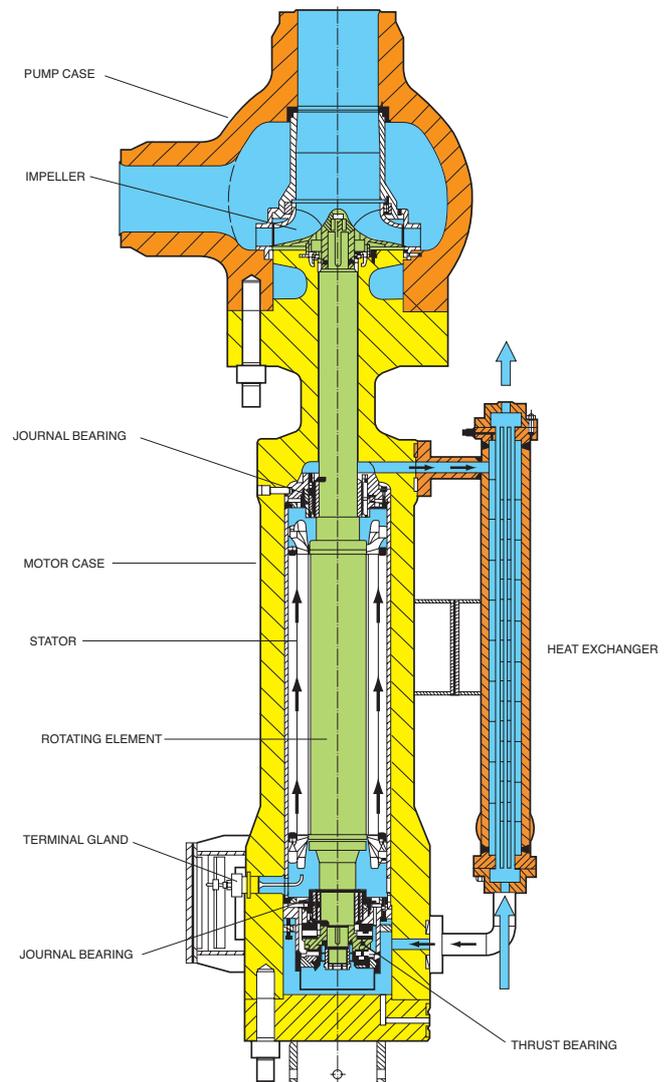
Employing state of the art finite element analysis and sophisticated flux modelling, Hayward Tyler motors are some of the most efficient of their type. Close attention to rotor dynamics enables us to design slim motors, reducing parasitic drag whilst at the same time not compromising reliability.



## Reactor Internal Pumps

Reactor internal pumps are a further adaption of the Hayward Tyler Glandless Motor Pump, but as the name suggests, the actual pump section is inside the reactor vessel, but the motor case is in the form of a pod welded to the outside.

Hayward Tyler manufactured the first Reactor Internal Pumps to be installed on the Boiling Water Reactors at Forsmark, Sweden and Olkiluoto, Finland. They are still operational today, having clocked up a quarter of a million hours, and their reliability has proved exceptional.



## Hayward Tyler Quality Assurance

Hayward Tyler has been established for almost 200 years, a reflection of the continued dedication to producing some of the most reliable and durable motors and pumps in the world.

When you buy Hayward Tyler products you also buy peace of mind. You will be secure in the knowledge that your product will not only offer a strong return on your investment but will always be backed by first class customer services, services that are at the heart of our success.

## Types of Units Available

- Wet Stator Motor Pumps
- Sealless Canned Motor Pumps
- Glandless Retrofit Motors.

## Applications

Hayward Tyler offer pump solutions for:

- Supercritical Boiler
- StartupDrum Boiler
- Re-circulation
- Fluidised Bed Boiler Circulation
- Economiser Re-circulation
- Nuclear Cooling and Safety Systems
- Reactor Circulation
- Retrofit Motors for existing conventional pumps.

## Options

Pumps

- Cast or forged pump case
- Single or double discharge.

Motors

- Any Voltage up to 11 kV
- Fluid-filled wet stator or canned dry 'Sealless' motors.

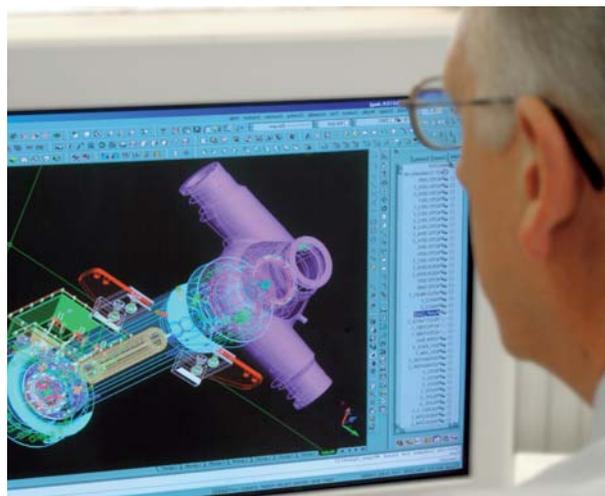
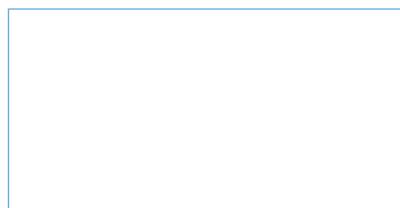
## Services and Aftersales

All our products are complemented by a set of service options that include:

- Servicing and Repair
- Performance Testing
- Field Support
- Spare Parts
- Reverse Engineering
- Field Support
- Energy Efficiency Programmes.

Our facilities span the world enabling us to offer routine or emergency on-site support anywhere in the world.

At Hayward Tyler we offer peace of mind as standard.



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