

**Standard Products Guide**  
**Regenerative Turbine Pumps**  
**Centrifugal Pumps**



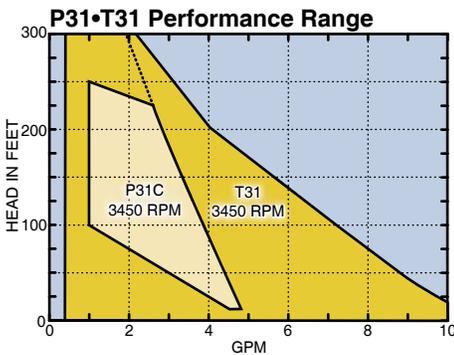
## Single Stage Close-coupled Turbine Products

MTH Pumps is a commercial and industrial pump manufacturer serving a wide variety of markets and industries including boiler feed, condensate return, chillers / temperature controllers, water services, refrigeration, petroleum, as well as many chemical process applications. Our Standard Product lines include mechanically sealed regenerative turbines for low flow, high pressure, applications (up to 1000PSI /

150GPM) as well as two lines of small centrifugals (155PSI / 230GPM). All pumps are tested before shipment. We also offer custom engineered products such as sealless canned versions of our turbine product lines as well as a large line of sealless canned centrifugal pumps in ranges up to 300PSI and 220 GPM. In fact, to our knowledge, MTH Pumps offers the broadest line of regenerative turbine and sealless

canned pump products available in the world. We also have extensive experience in custom designing pumps for specific OEM needs where high reliability and cost reduction are a primary concern. If you don't find what you are looking for in the Standard Products you see within this brochure, please consult our website at [www.MTHPumps.com](http://www.MTHPumps.com) or contact us at [Sales@MTHPumps.com](mailto:Sales@MTHPumps.com).

### P31 Series



MTH P31 Series regenerative turbine pumps handle capacities up to 4 1/2 gallons per minute and 250 feet of head at temperatures up to 250°F. These units feature an adjustable casing to provide variable performance output or readjustment of worn internal clearances to extend service life. Its compact size and top suction and discharge allow for installation in tight enclosures. These units feature stainless steel casings. Standard construction includes a bronze impeller, a carbon/ceramic seal, and Viton elastomers. All P31 pumps can mount onto ultra com-

pact 36 Frame UL and CE approved motors, as well as our dual face D3 motors. Optional motors with higher horsepower, solid state starting, TEFC enclosures, and 3 phase capabilities are also available.

#### OPTIONAL FEATURES

All Stainless Steel and RoHS compliant versions are available. A built-in relief valve is also available. The relief valve temporarily protects against dangerous over-pressure. All relief valves are pre-set at the factory to your specifications (60 to 100 psi range available).

### T31 • E41 • E51 Series



The T31, E41, and E51 Series close-coupled regenerative turbine pumps utilize our custom manufactured dual face 3450RPM D3 motors that incorporate a 304 stainless steel shaft and heavy-duty bearing. The stainless steel shaft eliminates the necessity

of a shaft sleeve, thereby reducing the parts count and simplifying OEM maintenance and servicing procedures. All D3 motors also feature a two-pole 50/60Hz rating, as well as UL and CE approvals useful for OEM's with worldwide customers. The three-phase

versions of the D3 motors feature a compact TEFC enclosure and a range from 1/3 to 3HP. The single phase D3 motors have an ODP enclosure and a range from 1/3 to 2HP. The E41 and E51 Series are also available in a close-coupled vertical flange mount configuration. Standard construction includes a bronze impeller, a carbon/ceramic seal, and buna elastomers.

#### OPTIONAL FEATURES

Construction materials of all iron (except T31), all bronze, and 316 stainless steel are available. Special seal materials, elastomers, and internal seal flush are available for temperature and fluid compatibility.

# MTH PUMPS Single Stage Turbine Products

## T41 • T51 Series

MTH T41 and T51 Series regenerative turbine pumps, like their E41 and E51 OEM versions, offer excellent performance in low flow, high head, clean fluid applications, but offer additional mounting and motor options for extended ranges and more specialized services. Like all of our turbine products, these units combine the latest concepts in turbine hydraulic design optimization, with computer controlled manufacturing, to produce high efficiency and performance with low NPSH requirements. These easily serviceable pumps provide long life in clean fluid applications featuring a floating, self-adjusting impeller design with no metal to metal contact. This design is especially suited to high purity and low fluid lubricity applications where the carbon vanes and metal gears of many positive displacement pumps are troublesome. Regenerative turbine impellers also effectively handle high percentages of entrained vapor to help reduce the possibility of vapor lock. All pumps are 100% tested to guarantee performance prior to shipment.

### CONSTRUCTION

Standard construction is cast iron bronze fitted. Internal wetted cast iron parts are either electroless nickel-plated or Teflon coated and the double-

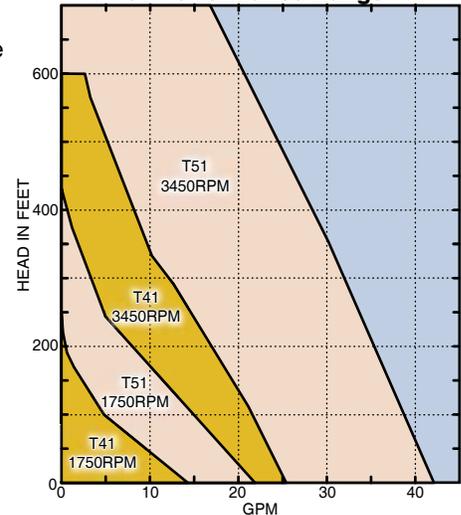


sided bronze impeller is hydraulically balanced to minimize wear. T Series pumps offer a replaceable shaft sleeve for maximum fluid compatibility. Standard seals are rated for 230°F Water.

### OPTIONAL FEATURES

Construction materials of all iron, all bronze, and 316 stainless steel are available. Pumps can also be pedestal mounted for flexible coupling drive by almost any type of motor. Special seal materials, elastomers, internal seal flushes, and seal cooling jackets are available for temperature and fluid compatibility. Sealless canned ST41 and ST51 Series are also available.

### T41•T51 Performance Range



## T41 • T51 Mounting Options



# MTH PUMPS High Pressure Multi-stage Turbine Pumps

## M50 • L50 Series

MTH **M50 and L50 Series** Regenerative Turbine Pumps are multi-stage versions of the popular T51 Series and are ideally suited for low flow applications (2 to 38 GPM) requiring higher discharge pressures than those available from a single stage unit. Head pressures to 2300 feet are available in a five stage M55. Both the M50 and L50 Series are available in close coupled, vertical base mount and horizontal pedestal base mounted configurations. For applications with low vapor pressure fluids, or where NPSH availability is low, the L50 Series adds a low NPSHR centrifugal inducer stage to help feed the high pressure regenerative turbine stages. Standard 56C face motors are used up to 3 HP. Vertical base mount pump motors 5 HP and larger are TEFC enclosure. Pedestal base mount pumps utilize standard rigid base motors.



From Left to Right: M52 Close-coupled Horizontal Base Mounted Pump w/C30 Motor, M53 Close-coupled Vertical Pump w/C30 Motor, M53 Close-coupled Vertical Pump w/C3 Motor, M51 Close-coupled Vertical Pump w/56C Motor

### CONSTRUCTION

Standard construction is cast iron bronze fitted. Iron parts are hard electroless nickel plated. Impellers are bronze, hydraulically balanced, and self-centering to minimize side wear. Pump shafts are 416 stainless steel, while interstage bushings are carbon/graphite in a stainless steel cartridge. Pump bearing pedestal and motor are furnished with permanently lubricated sealed ball bearings for maintenance free service. "O" ring gaskets are

utilized to assure sealing and for ease of maintenance. Standard mechanical seals are rated for 230°F water operation and furnished with a flush line on multi-stage pumps. All pumps are 100% tested to verify performance prior to shipment.

### OPTIONAL FEATURES

All iron, all bronze, and cast 316 stainless steel construction is available from stock. Buna, EPR, Viton, Neoprene and Teflon "O" ring and seal elastomer

materials, as well as silicon carbide, tungsten carbide, ni-resist, and graphite loaded silicon carbide seal seats are also available. For sealless canned versions of these units, see the SM50 and SL50 Series.

### L50 SERIES INDUCER

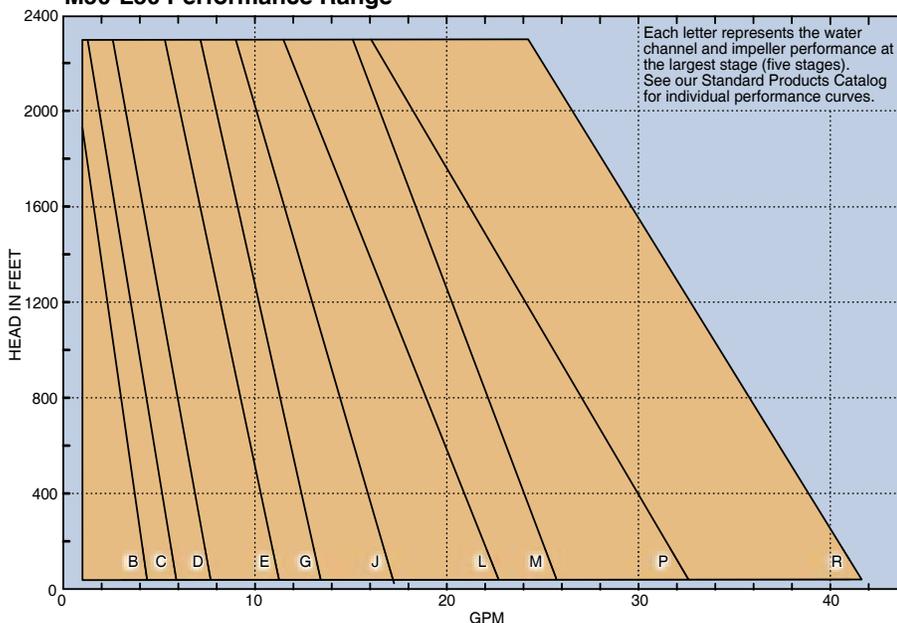
**L50 Series** inducer style pumps are designed specifically for applications where the net positive suction head available at the pump inlet is limited, such as in boiler feed water deaerator and refrigerant services. A centrifugal style impeller with low NPSH characteristics is utilized to lower the inlet head requirements.

This first stage impeller is used in conjunction with a multi-vane diffuser to provide the second stage regenerative turbine with adequate suction head.

L50 Series pumps can effectively handle NPSH availability as low as two feet, depending on the model and capacity.



### M50•L50 Performance Range



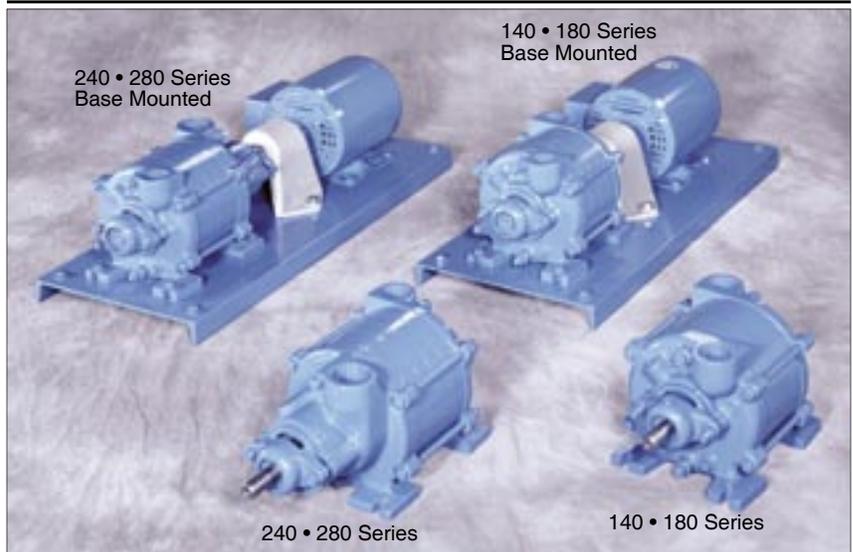
# MTH PUMPS Turboflex Multi-stage Turbine Pumps

## 140 • 240 • 180 • 280 Series

MTH Turboflex radially split foot mounted **100 and 200 Series** regenerative turbine pumps offer the high pressure characteristics of a multi-stage pump (heads up to 1150 feet) at flow ranges beyond those available in any of our other regenerative turbine products (up to 150 GPM). These heavy duty industrialized units also utilize the latest concepts in regenerative turbine hydraulic design, and benefit from tightly computer controlled manufacturing techniques. *Turboflex* pumps feature 1750 RPM motors to deliver long life and high efficiency performance with low NPSH requirements. For applications with NPSH availability as low as one foot, the 200 Series adds a centrifugal style inducer in front of the turbine stages. Like our other turbine products, the multi-vane turbine impellers handle entrained vapors to help reduce the possibility of vapor lock in boiler feed water, ammonia, and other refrigerant services.

### CONSTRUCTION

Standard construction is cast iron bronze fitted. Suction and discharge covers, seal cups, bearing arms and casing channel rings are cast iron material. Pump shaft is high strength 416 stainless



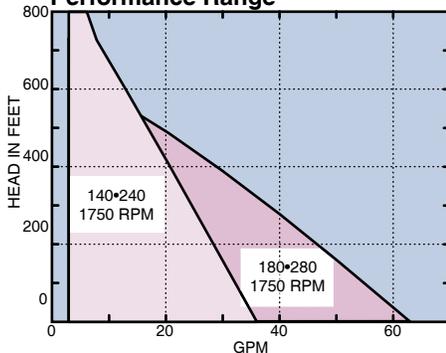
steel. Impeller is cast bronze, hydraulically balanced and self-adjusting for longer life. Sealed ball bearings are permanently lubricated for maintenance free operation. "O" ring gasketing is used to assure sealing and for ease of maintenance. Standard mechanical seals are rated for 230° F water operation. All units are flexible-coupled for easy service and motor flexibility. Pumps are 100% tested to guarantee performance prior to shipment.

construction. Silicon & tungsten carbide seal seats, EPR/Neoprene/Teflon/Viton "O" ring gasket materials, external seal flush, and balanced or double mechanical seals are also available. For low NPSH/low vapor pressure fluid service, the 200 Series adds an inducer stage. Reduced NPSHR is obtained by using a centrifugal inlet impeller along with a multi-vane diffuser to provide the second stage regenerative turbine with adequate suction head. NPSHR is reduced to as low as one foot on 240 • 280 Series pumps and as low as two feet on 250 • 260 • 270 Series pumps. Sealless canned models will be available in the future.

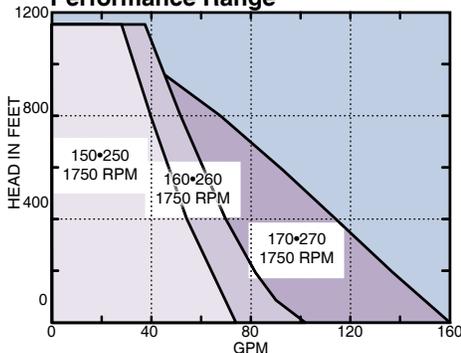
### OPTIONAL FEATURES

Turboflex pumps are also available in all iron, all bronze, and 316 stainless steel

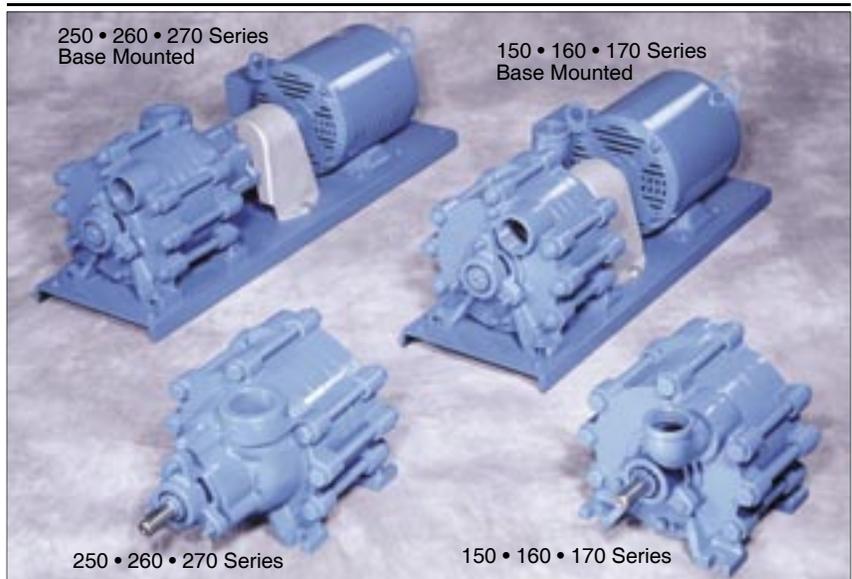
### 140•240•180•280 Performance Range



### 150•250•160•260•170•270 Performance Range



## 150 • 250 • 160 • 260 • 170 • 270 Series



# MTH PUMPS Compact Centrifugal Pumps

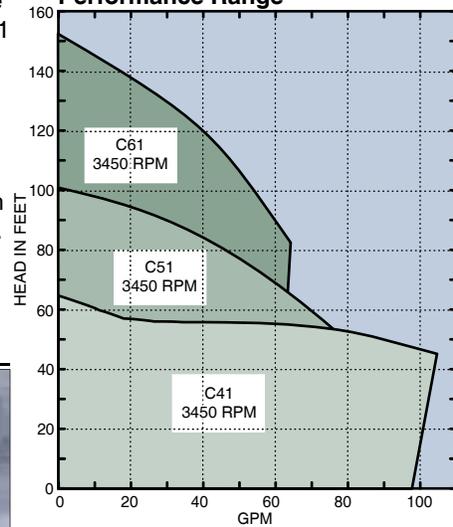
## C41 • C51 • C61 Series

For customers whose needs fall into the lower pressure ranges, MTH is proud to offer two lines of compact centrifugal pump products to complement our higher pressure regenerative turbines. Towards this end, MTH has developed the high quality, low cost 4", 5", and 6" **C Series**, semi-open impeller, all stainless steel centrifugal pumps. These units are cost competitive against stamped stainless steel centrifugal pumps, but with a heavy duty cast impeller and casing design. Each pump model is pre-trimmed and selected to provide the best pressure and capacity for a given impeller and motor horsepower combination (up to 3HP and 100GPM). Adjustment screws on the C Series casing take advantage of the semi-open impeller design by providing the capability to occasionally renew pump performance by tightening internal clearances and minimizing losses developed from nor-



mal wear. These units also make use of our custom manufactured D3 dual face motors found on our T31, E41, and E51 turbine pumps, and feature a stainless steel shaft and a heavy duty front motor bearing. D3 Motors also feature UL and CE approvals. The C Series standard construction is investment cast 316 SS casings and impellers with Viton elastomers. Options - See below.

### C41•C51•C61 Performance Range



## D51 • D61 • D71 • D91 Series



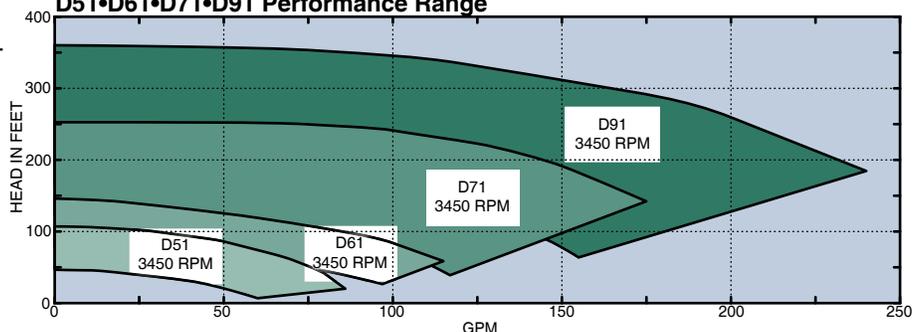
The 5", 6", 7", and 9" **D Series**, closed impeller, cast iron bronze fitted and all bronze centrifugal pumps were designed with more flexibility and options to cover the wide range of applications found in the general industrial market up to 25HP. The D Series close-coupled centrifugal pumps provide economical high performance for 5 to 230 GPM applications requiring heads from 10 to 360 feet. Standard 56J and JM frame motors are utilized for increased motor options. Units are trimmed to order for each customer application. The D51 and D61 models are cast iron bronze fitted, while the D71DE and

D91EF models are all bronze. Buna elastomers are standard on the entire D Series line. D Series pumps use carbon/ceramic seals as standard and are rated for 230°F (110°C) operation.

### OPTIONAL FEATURES

C Series and D Series centrifugal pumps both offer a variety of seal and elastomer options. The D Series also offers a wide variety of optional motors, as well as self-priming, vertical flange mount, and high temp seal cooling jacketed variants. For highly customized sealless centrifugal solutions for refrigeration, please see our line of HRC Series sealless canned centrifugal pumps.

### D51•D61•D71•D91 Performance Range



# MTH PUMPS Engineered Products and Accessories



The mission of MTH Pumps is to design, develop, and produce pumping products to fit applications in which they are technically correct solutions that also address the peripheral needs of the customer. To this end, the company has endeavored to become

highly vertically integrated to maximize the flexibility and agility of the company to meet product and customer needs. To facilitate the engineering centered nature of the company, MTH has acquired a number of resources needed to bring it to the leading edge of engineered product design and development. MTH utilizes highly



experienced design engineers, solid modeling CAD software, rapid prototyping equipment, its own pattern and mold making shop, its own foundry and fabrication shop, state

of the art auto-loading CNC machining equipment, and a wealth of inspection and testing equipment to rapidly design and develop the right solution for the job. In many cases, the design of custom pumps and accessories has netted a significant cost savings to the customer over the use of standard off the shelf products. Whether the customer is looking for a slight modification to one of our standard products, a totally new pump design, or a completely different kind of product, MTH has the broad range



## MTH Pumps In-house Capabilities Include:

- Creative Engineering services
- Solid modeling design
- Rapid Prototyping tools
- Pattern and mold making shop
- Bronze and Aluminum casting foundry (casting services inquiries invited)
- Highly automated state-of-the-art CNC machine shop
- Complete Metal Fabrication Facility (fabrication services inquiries invited)
- Custom designed assembly/testing equipment and facilities
- Customized packaging and labeling capabilities
- Large finished inventory capacity for high availability and rapid shipment
- Dedicated Service and Repair Facility



of resources required to complete the task.

In the area of pump design, MTH has entered into the sealless pump market with sealless canned versions of many of our standard products such as the SM50, SL50, ST31, ST41, ST51, SP31, and more are coming. Other custom OEM sealless products utilize extended shaft vertical immersible or controlled leakage designs. We have also developed products for special centrifugal designs, DC applications in both sealless and sealed versions, disk friction centrifugal's, axial flow turbines for aerial firefighting, and submersible craft trim and drain pumps. Other engineered products and accessories include the X41 Series of sealless canned chiller pumps, seal quench glands to extend seal life in difficult applications, special valves and suction strainers, mounting brackets, stainless steel tanks and systems, and custom piping trees and manifolds. For MTH customers, our advice is always: "if you don't see it, please ask."



While MTH Pumps' primary talents lie in engineering design, our efforts to meet and exceed customer specifications and satisfaction extend beyond the engineering and manufacturing arena. Special sourcing arrangements, construction materials, custom assembly, packaging, labeling, and testing services, quality surveillance, inventory stocking arrangements, and JIT shipping schedules are all a part of the solution that our existing customers have found in a valuable product partner that is MTH Pumps.

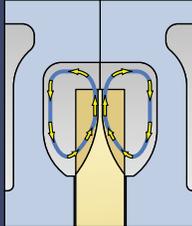


## MTH PUMPS

# Regenerative Turbine Education

The primary difference between a centrifugal and a regenerative turbine pump is that fluid only travels through a centrifugal impeller once, while in a turbine, it takes many trips through the vanes. Referring to the cross-

section diagram, the impeller vanes move within the flow-through area of the water channel passageway.

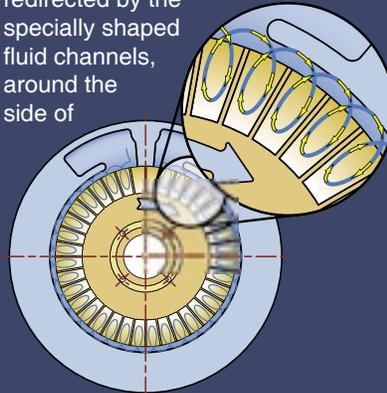


Once the liquid enters the pump, it is directed into the vanes which push the fluid forward and impart a centrifugal force outward to the impeller periphery. An orderly circulatory flow is therefore imposed by the impeller vane which is converted to velocity. Fluid velocity (or kinetic energy) is then available for conversion to flow and pressure depending on the external system's flow resistance as diagrammed by a system curve.

It is useful to note at this point, that in order to prevent the internal loss

of the pressure building capability of an MTH regenerative turbine, close internal clearances are required. In many cases, depending on the size of the pump, impeller to casing clearances may be as little as one-thousandth of an inch on each side. Therefore, these pumps are suitable for use only on applications with clean fluids and systems, or else the fluid must be pre-filtered before reaching the pump.

Next, as the circulatory flow is imposed on the fluid and it reaches the fluid channel periphery, it is then redirected by the specially shaped fluid channels, around the side of



the impeller, and back into the I.D. of the turbine impeller vanes, where the process begins again. This cycle occurs many times as the fluid passes through the pump. Each trip through the vanes generates more fluid velocity, which can then be converted into more pressure. The multiple cycles through the turbine vanes are called regeneration, hence the name regenerative turbine. The overall result of this process is a pump with pressure building capability ten or more times that of a centrifugal pump with the same impeller diameter and speed.

In some competitive designs, you will find that only a single-sided impeller is used. That design suffers from a thrust load in the direction of the motor that must be carried by the motor bearings. MTH turbines use a two-sided impeller design that builds pressure equally on both sides. This has the advantage of allowing the pump pressure to hydraulically self-center the impeller in the close clearance impeller cavity, while not burdening the motor bearings with excessive thrust loads.



1. 240 • 280 Flex-coupled Pumps
2. 140 • 180 Series Pumps
3. T51 Flange Mounted Pumps
4. M50 • L50 Vertical Pumps
5. M51 Vertical Inline Pumps
6. 150 • 160 • 170 Series Pumps
7. 250 • 260 • 270 Series Pumps
8. D51DM Vertical Flange Pumps
9. D51EE Self-priming Pumps
10. D51CD Cooling Jacketed Pumps
11. D51CD Centrifugal Pumps
12. D61DE Centrifugal Pumps
13. D71DE Centrifugal Pumps
14. D91EF Centrifugal Pumps
15. E51 • T51 Close Coupled Pumps
16. E41 • T41 Close Coupled Pumps
17. T31 Close Coupled Pumps
18. P31 Close Coupled Pumps
19. C41 Centrifugal Pumps
20. C51 Centrifugal Pumps
21. C61 Centrifugal Pumps



## MTH PUMPS

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