

*SOLIDS-HANDLING
PUMPS*



 **Fairbanks Morse**

 **Pentair Pump Group**

HISTORY/ DEVELOPMENT

Since the early part of this century, Fairbanks Morse Pump has set industry standards in innovative engineering, manufacturing and successful operating experience of solids-handling pumps. Fairbanks Morse designed the first non-clogging impeller. The first bladeless impeller was designed and patented by Fairbanks Morse and became commercially available in 1935. In the early 1950's, Fairbanks Morse pioneered the first "submersible" solids-handling pumps for both dry and wet pit applications in solids, slurry, pulp and sludge handling pumping equipment, and more recently Vertical Turbine Solids-Handling (VTSH®) pumps have been developed and marketed.

From just a few gallons per minute to over 100,000 GPM, Fairbanks Morse solids-handling pumps cover a broad range of hydraulics with outstanding dependability. All dry pit pumps, available in vertical or horizontal configurations, are designed and built in a facility dedicated to the research, development and manufacturing of pumping equipment. Integrated machining, assembly, testing and inspection assures unparalleled quality and reliability. The careful design of pumps allows for ease of disassembly and servicing. Parts and service are available throughout the world from the Fairbanks Morse factory, authorized distributors and repair centers.

All this is why hundred of thousands of successful Fairbanks Morse pumps are in operation around the world.

APPLICATIONS/ INSTALLATIONS

Fairbanks Morse offers dry pit pumps in four basic configurations: horizontal, vertical-coupled via intermediate shafting, vertical close-coupled and vertical biltogether. The liquid end hydraulics are identical and provide numerous driver mounting and coupling designs. With the exception of the biltogether, in which the motor bearings carry the thrust and radial loads, the bearing frames are standardized among the various configurations. This permits wide interchangeability of spare parts and maximum flexibility to satisfy changing customer demands. Pumps can be modified to large or smaller sizes, or changed from horizontal to vertical and vice versa. The pumps can be revised by a simple service order, saving the user from having to purchase complete new equipment.

With over 100 years of proven experience in the pumping of solids, slurries, sludge, pulp, trash, sewage and grit, Fairbanks Morse Pump has the product and engineering knowledge to meet your pumping needs. A number of precision cast impellers are offered in two-vane, bladeless and recessed designs.



Large passageways, blunt well-rounded leading vanes, and thick hydrofoil shape prevent long stringy material from wrapping around the leading edge. Impellers are matched with thick-wall equalizing-pressure, constant-velocity volutes. This design channels the flow away from the impeller vanes into the circular flow area of the impeller passageways and casing, to assure passage of large solids and long stringy materials, reduce turbulence and radial and bending shaft forces. Abrasive wear is minimized, bearing, mechanical seal (when used) and shaft life is lengthened, and most important, maintenance

and downtime costs are greatly reduced, resulting in true savings. An added advantage is a smooth, quiet and trouble-free installation.

Used primarily in sewage lift stations and treatment plants where sewage flows are relatively low, the bladeless impeller will handle 10-25 percent more solids, long stringy material and trash than a conventional two-vane impeller. Interchangeability of the two-

vane and bladeless impeller designs allows for existing stations to adapt to changing conditions by simply changing out the impeller. No changes to piping, drive shafts or pump setting are required.

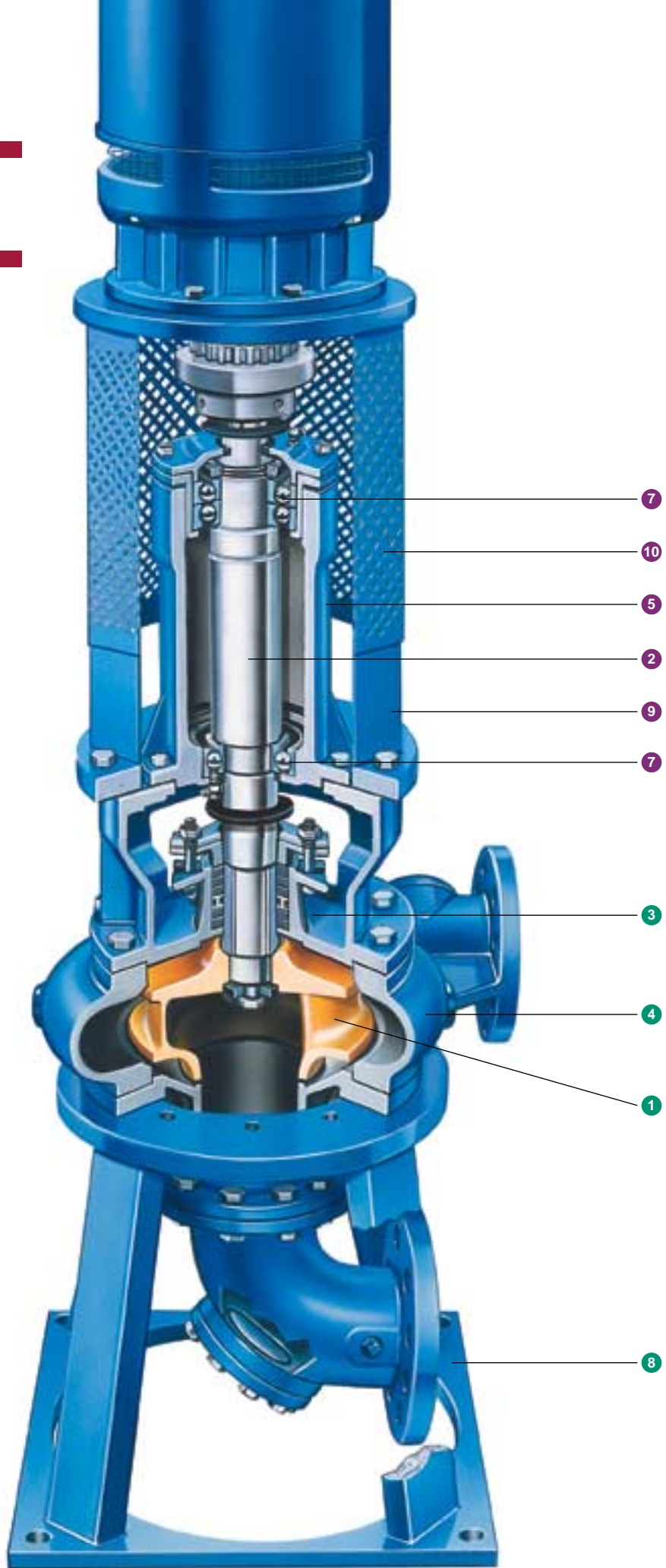


Solids-handling pumps often operate in unattended pump stations and other installations which require utmost reliability and freedom from clogging or other downtime maintenance. Plants today demand pumps to provide sustained high performance, the best possible design to resist clogging, and mini-

mum size driving motors and controls to reduce construction and operation costs.

Fairbanks Morse dry pit solids-handling pumps can be found in a variety of installations, including sewage lift stations and treatment plants, fibrous sludge and slurry handling, pulp and general industrial solids-handling service.

**VERTICAL
CLOSE-COUPLED**



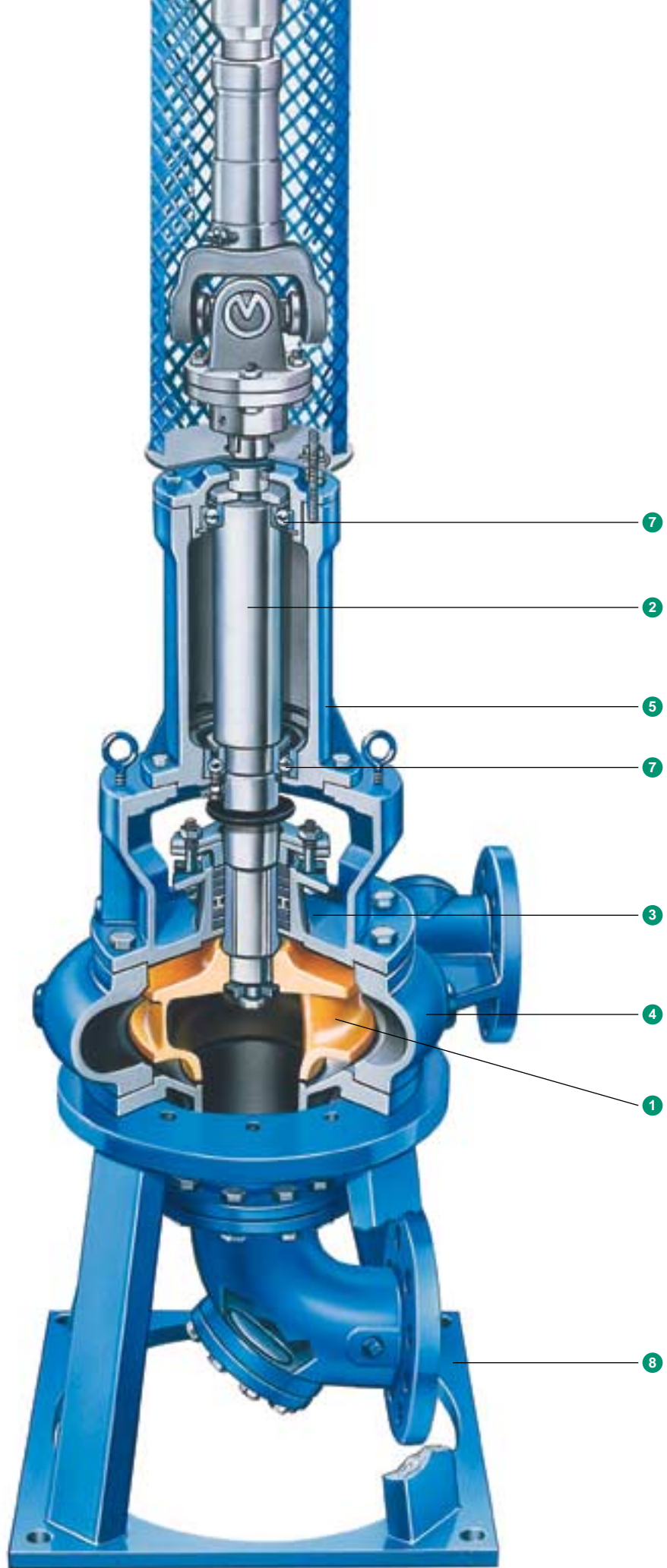
Safety equipment and labels may have been removed or not illustrated in order to better depict the product. All shipped products include appropriate safety labels and guards. The safety labels must be adhered to and the guards must be in place prior to installation and operation.



***VERTICAL
FLEX SHAFT***

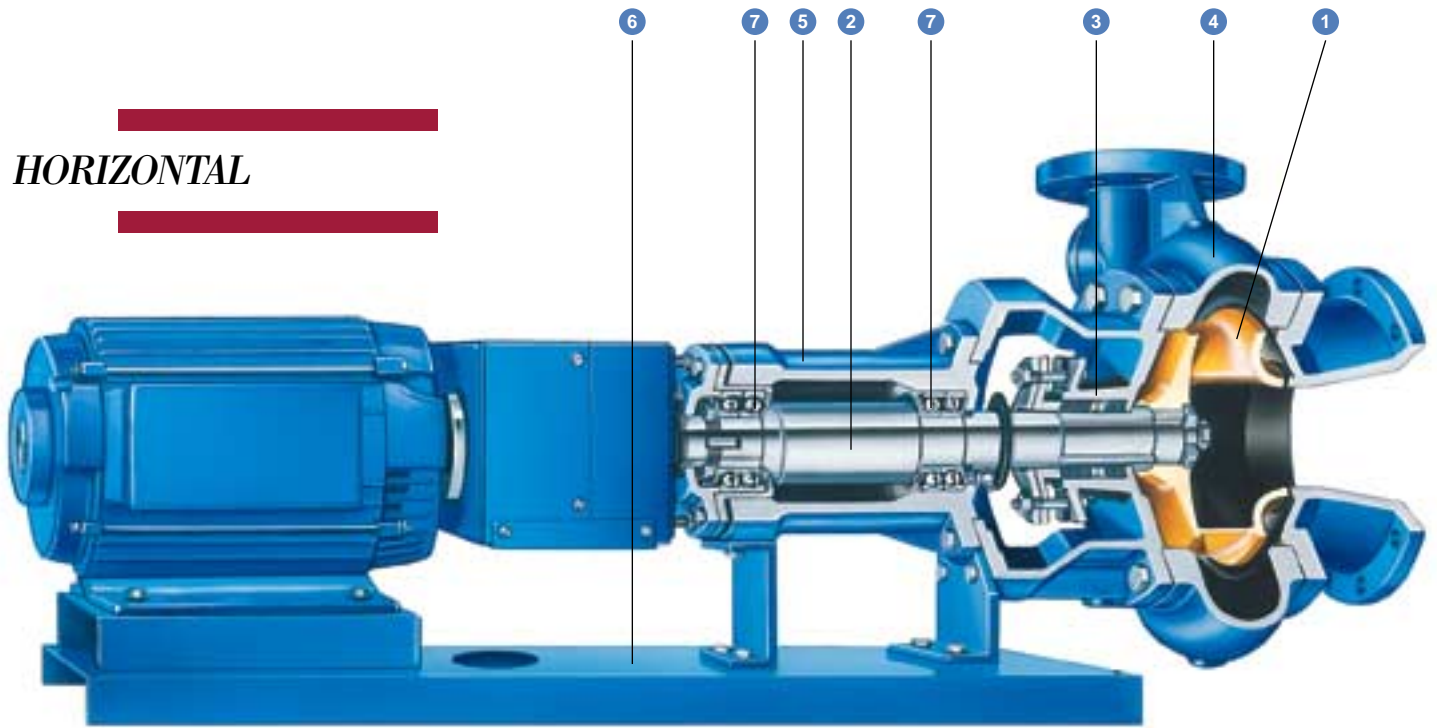
A heavy-duty, one-piece, integrally cast combination base/elbow is available on most 4" vertical pumps in lieu of a separate base and elbow. The cast iron base incorporates a contoured handhole cleanout located 180 degrees from the suction flange.

Stainless steel and other materials are available for the impeller and casing wear rings.



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HORIZONTAL



1 Available in either an efficient radial flow, non-clog two-vane, or bladeless design, impellers have blunt, well-rounded leading vanes and a thick hydrofoil shape to pass large solids and long stringy material. Precision cast impellers are designed and matched specifically to the equalizing-pressure, constant-velocity volute. Impellers are secured to the shaft with key and locking bolt.

2 Heavy-duty, high strength manganese steel shafts are rated for 100,000 psi tensile strength and 75,000 psi yield strength. Shafts are accurately machined over their entire length and precision ground at the bearing surface. Through the stuffing box area, the shaft is protected with a renewable stainless steel sleeve, and positively sealed to prevent leakage between the shaft and sleeve.

3 The rugged backhead is accurately machined to ensure shaft alignment with an oversized, integrally cast packing box. This box is designed for use with packing or virtually all popular mechanical seals without the need to re-machine. A two-piece interlocking gland is used to keep a minimum of five rings of packing and a split water seal ring in place. With a double mechanical seal, a solid one-piece gland is used. The stuffing box has a 1/4" injection and vent tap for clear water or grease connection.

The backhead is tapped for ease of connection piping to route packing box leakage to the drain. The backhead has a large opening for easy access to the packing box for gland adjustment and packing removal.

4 The one-piece, thick-walled circular volute has rounded fluid passages designed to transport any size solid that passes through the impeller. The volute incorporates a large cleanout opening, allowing access to the impeller. The entire rotating assembly can be removed without disturbing the piping. (On horizontal units, a spacer-type coupling is required to remove the rotating assembly without disturbing the driver.)

5 Heavy-duty cast iron bearing frames are machined to assure accurate alignment. A lip-type grease seal contacts the shaft to prevent the entrance of contaminants into the bearing housing. Zerk-type grease fittings are used for lubrication. Jacking bolts allow for external impeller adjustment to maintain original pump hydraulics and extend pump life.

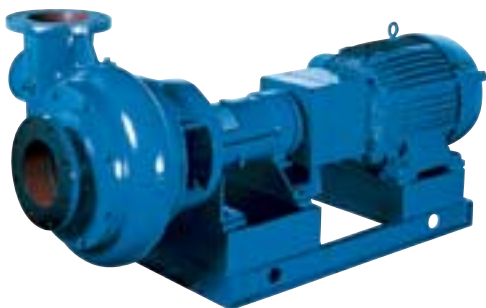
6 Horizontal pumps are mounted on a steel base with mounting feet bolted to the pump frame and backhead.

7 Radial and thrust loads dictate what bearing combinations are required. Combinations of single and double row bearings are used to provide long bearing life. Bearings are deep-groove, grease lubricated. Horizontal pumps are also available with oil lubricated bearings. Bearings are designed for a nominal L10 life of 100,000 hours.

8 Vertical pumps are mounted on a rigid structural base to support the weight of the pump and motor. The open base construction allows access to the suction elbow, gauge connection and large contoured handhole cleanout.

9 In a vertical close-coupled configuration, the pump includes a motor base. This rugged, heavy-duty base supports the weight of the motor and has sufficient height and large openings for easy access to the coupling.

10 An OSHA coupling guard is provided as standard in close-coupled construction.



Horizontal pumps and motors are mounted and accurately aligned on a heavy-duty steel base. The flexible coupling is enclosed in an OSHA coupling guard.

BILTOGETHER PUMP



The 5400 Series solids-handling pumps are available in a biltogether configuration. The suction elbow, base, volute and impeller are identical to other configurations. The biltogether arrangement features an impeller mounted directly on the high-strength motor shaft. A renewable stainless steel sleeve protects the shaft through the mechanical seal area. The motor is designed to provide a nominal L10 bearing life of 40,000 hours at best efficiency point.

These biltogether units are typically applied in sewage lift station applications.

SELF-PRIMING



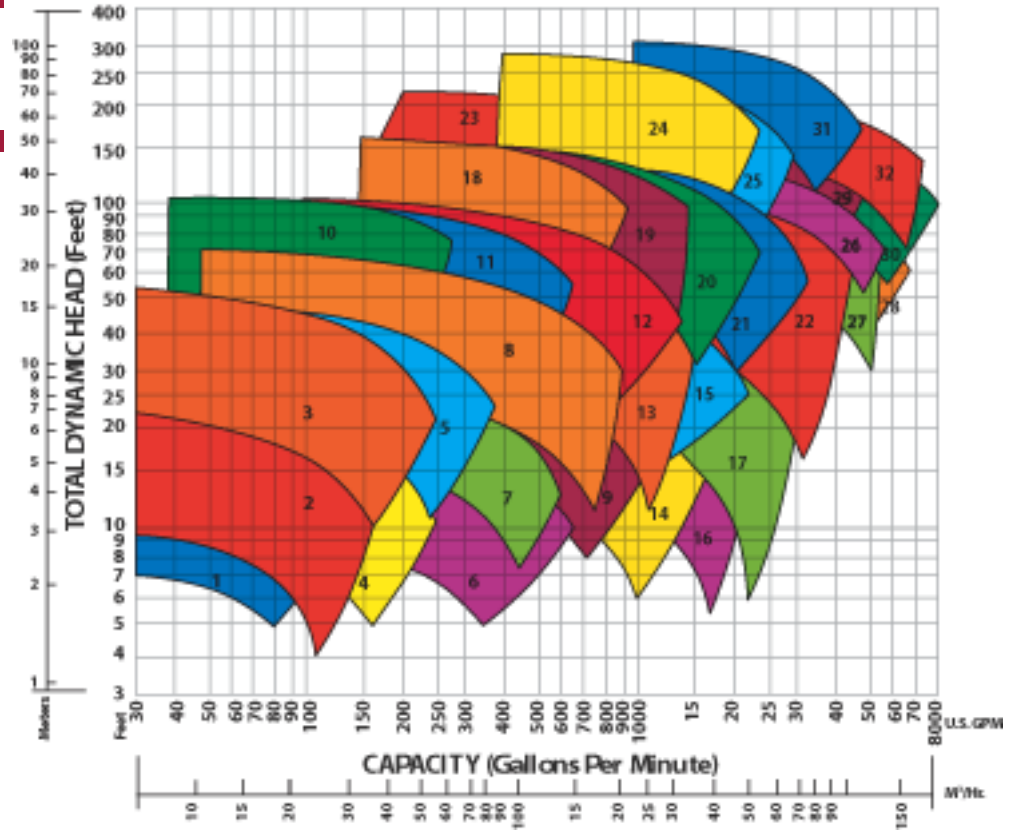
The unique self-priming pump design is used when the pump must be capable of pulling a suction lift, and operating on an intermittent basis without manual priming.

The impeller can be accessed and removed through the front housing by way of quick twist knobs. A second access plate is provided at the pump suction as well, for quick inspection or cleanout.

The shaft is sealed with a double mechanical seal that is lubricated via a line off the pump discharge or with oil from an oil reservoir, and is dead-ended in the stuffing box. A filter removes abrasive particles, protecting the seal.

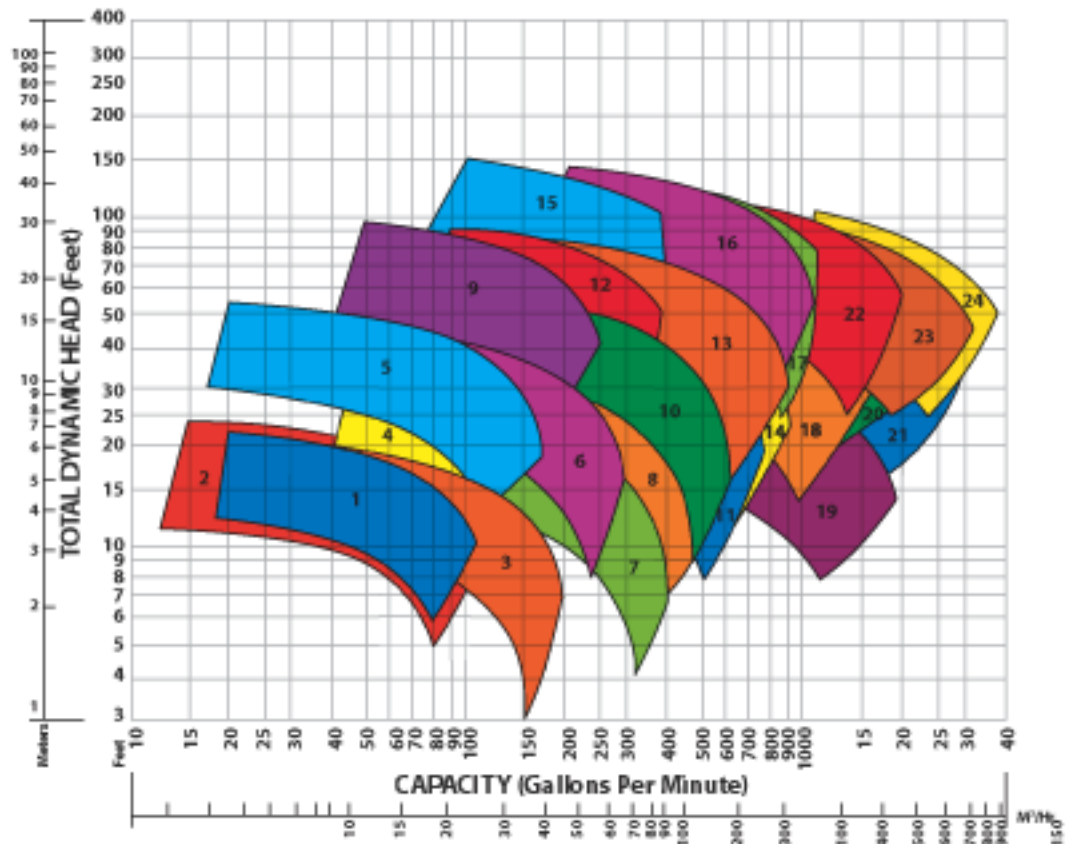
NON-CLOG PERFORMANCE

- | | |
|--------------------|----------------------|
| 1. 1" - 54x2, 900 | 17. 8" - 54x4, 900 |
| 2. 2" - 54x1,1200 | 18. 3" - 54x3,1800 |
| 3. 2" - 54x1,1800 | 19. 4" - 54x3,1800 |
| 4. 3" - 54x2,1200 | 20. 5" - 54x3,1800 |
| 5. 3" - 54x1,1800 | 21. 6" - 54x3,1800 |
| 6. 4" - 54x2, 900 | 22. 8" - 54x4,1200 |
| 7. 4" - 54x3,1200 | 23. 4" - 54x5,1800 |
| 8. 4" - 54x1,1800 | 24. 4" - 54x4,1800 |
| 9. 5" - 54x3,1800 | 25. 5" - 54x6,1800 |
| 10. 2" - 54x2,1800 | 26. 8" - 54x5,1200 |
| 11. 3" - 54x2,1800 | 27. 10" - 54x5, 900 |
| 12. 4" - 54x2,1800 | 28. 10" - 54x10, 720 |
| 13. 5" - 54x3,1200 | 29. 8" - 54x6,1200 |
| 14. 6" - 54x3, 900 | 30. 10" - 54x10, 900 |
| 15. 6" - 54x3,1200 | 31. 6" - 54x6,1800 |
| 16. 8" - 54x4, 720 | 32. 10" - 54x5,1200 |



BLADELESS PERFORMANCE

- | |
|----------------------|
| 1. 2" - 54x1K, 1200 |
| 2. 2" - 54x2K, 900 |
| 3. 3" - 54x1K, 1200 |
| 4. 2" - 54x2K, 1200 |
| 5. 2" - 54x1K, 1800 |
| 6. 3" - 54x1K, 1800 |
| 7. 4" - 54x1K, 1200 |
| 8. 4" - 54x2K, 1200 |
| 9. 2" - 54x2K, 1800 |
| 10. 4" - 54x1K, 1800 |
| 11. 4" - 54x3K, 1200 |
| 12. 3" - 54x2K, 1800 |
| 13. 4" - 54x2K, 1800 |
| 14. 5" - 54x3K, 1200 |
| 15. 3" - 54x3K, 1800 |
| 16. 4" - 54x3K, 1800 |
| 17. 5" - 54x3K, 1800 |
| 18. 6" - 54x4K, 900 |
| 19. 8" - 54x4K, 720 |
| 20. 8" - 54x4K, 900 |
| 21. 10" - 54x5K, 720 |
| 22. 6" - 54x4K, 1200 |
| 23. 8" - 54x4K, 1200 |
| 24. 10" - 54x5K, 900 |





In addition to dry pit solids-handling units described in this brochure, Fairbanks Morse Pump manufactures a complete range of pumps for the public works, industrial and fire protection markets, including submersible solids-handling, horizontal split case, vertical lineshaft and submersible turbine, mixed-flow and axial-flow propeller pumps (both electric motor and diesel engine driven), and a new concept in solids and slurry handling, the Vertical Turbine Solids-Handling (VTSH®) pump.

Our 400,000 square foot manufacturing complex, located in the heart of the United States, provides advanced engineering and technology, computerized machining centers to process parts and a major testing facility for product performance evaluation. Fairbanks Morse sales and service facilities are conveniently located throughout the United States and the world.

At Fairbanks Morse our longevity, distinctive products, market leadership and customer service are the direct result of the quality and dedication of our personnel. Our units are machined, built and tested by skilled shop personnel who average over 23 years of experience. Working as a team, our people continually explore new ways to better serve our customers. Product quality, dependability and innovation are all part of the Fairbanks Morse commitment to excellence.

– Your Authorized Local Distributor –

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