

Vertical Turbine Firefighting Pump Installation

Dear engineers we are giving below a complete method statement that can be helpful for the installation of vertical turbine firefighting pump for any project.

Before start of the work ensure that all latest approved related documents like drawings are available for reference. All installation at site shall be based on approved shop drawings, specifications, method statement procedures, codes and standards. Project Engineer / Supervisor will ensure that safety requirements have been complied with and are in place.

Project Engineer / Supervisor will orient and familiarize all the workers and assistants involved in the installation regarding relevant approved drawings, technical submittals, installation procedures and details, acceptance criteria. Install fire protection systems in accordance with **NFPA**, listings and manufacturers recommendations.

Locate pump discharge piping (and suction piping when applicable) as well as auxiliary equipment, control and starting panels so that adequate access is provided for maintenance. Adequate floor space and working room should also be provided for maintenance.

Preparation of Foundations for Pumps

The pump must be installed on a foundation rigid enough to support the entire weight of the pump plus the weight of the fluid contained in it. Weak foundations or foundations on unstable ground can cause misalignment, vibration, and even total foundation failure. Therefore make sure the foundation is already approved with required load calculations. The mass of the foundation should be sufficient, preferably five times that of the rotating element of the pumping equipment, to form a permanent and rigid support for the base plate or discharge head. This is equally important whether the pump is installed over a pit, over a well or into a suction barrel.

Rigging and Lifting of Pumps

For typical installations, suitable overhead lifting equipment of adequate capacity to lift the driver, the entire pump (without driver)

or the heaviest sub-assembly of the pump should be available at the job site when installing or removing the pump. All **HSE** related precautions to be implemented as per the method statement and risk assessment. Adequate head room should be provided to accommodate the longest section of the pump to be handled, including rigging. Properly sized slings, chains and shackles should be available for attaching to the lifting lugs (eyes). Eye-bolts are required for handling pump sections when lifting lugs are not provided

Installation Method of Firefighting Pumps

1. Position lifting equipment so it will center over the foundation opening. Sump and piping should be thoroughly cleaned of all loose debris before starting installation. Clean pump discharge flange.
2. All machined surfaces are coated with rust prevention substance prior to shipment this must be completely removed along with any paint over-spray or rust, which might be on the machined faces.
3. The faces should be scraped and wire brushed first and then fine emery cloth used to remove any stubborn spots. Use a fine file to remove any nicks or burrs.
4. All the threads should be checked for damage and repaired if necessary. Clean all threads with wire brush and cleaning solvent.
5. Ends of shafts must be cleaned and any burrs removed since alignment depends on the shaft ends butting directly.
6. Apply thread lubricant sparingly to male shaft threads only when making up shaft connections.
7. Lift the pump and lower slowly into the sump, using the lifting lugs on the discharge head. Hand guide the pump as it lowered and watch for any obstruction or binding of the pump, which can be felt through the hands.
8. Rotate pump until discharge flange faces proper direction for alignment with piping and align anchor bolt holes.
9. Slowly lower pump onto the foundation.
10. Install anchor bolts or nuts, but do not tighten.
11. Pipe from discharge shifting the pump slightly on the foundation if required to facilitate alignment.

12. Tighten discharge flange bolting- be sure the flange mate without forcing.
13. Tighten anchor bolting.

Connection of Suction Piping Valves, Strainers & Manifolds

- A vertical pump in a suction barrel performs properly only if it is supplied with a steady flow of liquid with a uniform velocity profile and with sufficient pressure to provide adequate NPSH to the pump.
- Failure of the suction piping to deliver the liquid to the pump in this condition can lead to noisy operation, swirling of liquid around the suspended pump assembly, premature bearing failure and cavitation damage to the impeller and inlet portions of the casing.
- Block valves may be installed to isolate the pump for maintenance for dry pit applications. Foot valves are specially designed non-return valves sometimes used at the inlet to bowl assemblies for good pumps to keep the column water filled and to prevent backspin and good disturbance caused by rapidly draining water.
- A non-return valve and an isolation valve should be installed in the discharge pipe. The non-return valve serves to protect the pump from backflow and excessive back pressure. The isolation valve is used when starting and stopping the pump.
- Non-return valves may be installed in the discharge pipe to prevent backflow. In some applications, non-return valves may be provided with dashpots to mitigate the slamming effect of the valve during closing.
- To keep unwanted solids out of the pump, a strainer may be installed at the suction bell or case. Accumulation of debris can induce a moderate pressure drop. The strainer typically clears itself by backflow in the pump column when the unit is stopped.
- **Setting the Impeller Clearance:** The rotating element (shaft and impeller) should be raised axially before start up. An adjusting nut or pump-to-driver shaft coupling is provided for this purpose, and the pump shaft should be raised per the manufacturer's recommendation.

ALIGNMENT:

- Vertical line-shaft pumps are automatically aligned through registered fits between mating parts. However, we recommend checking the alignment of the head shaft to the driver at the time of final installation. After the grout, has set and the foundation bolts have been properly tightened, the unit alignment should be checked. After the discharge piping of the unit has been connected, the alignment should be checked again. Alignment may be checked by mounting a dial indicator to measure shaft movement before and after tightening flange bolts.
- If the unit does not stay in alignment after being properly installed the possible causes can be setting, seasoning or springing of the foundation or excessive pipe strain distorting or shifting the machine.