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HOW TO GET THE BEST RESULTS FROM CENTRIFUGAL PUMPS
By H. K. GIBSONE, Officer-in-Charge, Irrigation Branch

MANY thousands of centrifugal pumps are operating throughout the State, and from observations made while travelling around the country I find that, like the windmill, the pump is very frequently a neglected piece of equipment. The following hints may assist users to get to obtain good results from their pumps. Most of them are taken from a check list prepared by Mr. A. B. Lohr of the Engineering Department, Goulds Pumps Inc., New York.

The centrifugal pump is a sturdy and dependable piece of machinery which seldom fails to perform satisfactorily providing it is properly installed, adjusted, lubricated and operated within its rated capacity. The following pointers will help growers to get the best possible service from their pumps.

INSTALLATION

Where the pump is part of a permanent installation it should be properly set in on a concrete foundation and carefully levelled. When a flexible coupling is used, check the alignment with a feeler gauge and straight-edge.

In the case of portable units the pump unit should be blocked so that it is perfectly level and cannot creep. The alignment should be thoroughly checked each time the pump is operated.

All piping should be supported independently of the pump to relieve the machine of unnecessary strain. Suction piping should be as short and direct as possible, sloping upward from the supply to the pump. The suction lift should be not over 16ft. including the friction head. The suction piping should be as large as the pump suction and, if more than 20ft. long, a size larger, reducing at the pump with an eccentric reducer to avoid any air traps in the line.

All piping joints must be airtight and the discharge piping should be at least as large as the pump discharge with as few fittings as are practicable.

The strainer should be installed at least 3ft. below the lowest level in the water supply, and should be inspected and cleaned frequently to ensure that it is free from foreign matter.

PRIMING

In the case of self-priming pumps the casing must be filled with water when started for the first time, after which they will prime themselves for future starts.

Those pumps which are not self-priming must be primed for the first start and then the prime can be held by a foot-valve in the suction line. Such pumps should be checked before each start as the check valve or stuffing-box may leak, causing the pump to lose its priming.

The centrifugal pump shown in the photograph is a simple single-stage pump of a popular type. It is shown being electrically driven by a flat belt, but would be more efficient if a V-belt drive was used. Note that the suction and delivery pipes are attached to reinforced rubber flexible hoses. The photograph also shows the solid concrete foundation which is essential for these pumps.

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Motor-driven pumps are usually primed by pouring or pumping water by hand into the priming opening in the casing until water comes out of the open vent valve on top of the casing.

Engine-driven pumps are sometimes equipped with an exhaust primer. When using, be sure that there is some water in the casing to lubricate the rotating parts during the priming period.

Never run the pump unless it is fully primed.

**LUBRICATION**

Motors with ‘lubricated for life” bearings require no greasing, but other ball-bearing motors should be greased about every two or three months. Do not over-grease, and consult the motor manufacturers’ instruction sheet if available.

The manufacturers’ instructions for oiling and greasing should be faithfully adhered to where petrol or kerosene engines are used. The bearings of the pump should be lubricated according to the instruction sheet issued by the makers.

**STUFFING-BOX**

Where this feature has a mechanical seal it requires no adjustment and should be repaired only by factory-trained men.

In the case of packed stuffing-boxes, regular care is necessary and the gland should never be tightened so that there is no leakage or so that the box heats up in use. The stuffing-box should leak at least 40 to 60 drops per minute and the gland nuts should be adjusted evenly and only finger-tight.

Where a grease lubricator is used give the handle a turn or two after about every hundred hours’ operation.

**PROTECTION OF EQUIPMENT**

Keep the pumping unit covered during wet weather. Disconnect all exposed electrical connections when not in use and install suitable warning signs. In districts where heavy frosts are encountered, drain the pump and engine during freezing weather.

When starting the unit during winter or during long off-periods, drain pump and remove the stuffing-box packing, grease the shaft and dry the pump thoroughly.

**TROUBLE CHECK LIST**

1. **If not enough water is delivered.**
   (a) Pump not completely primed.
   (b) Speed too low.
   (c) Suction lift too high.
   (d) Discharge pressure too high.
   (e) Impeller or suction pipe clogged.
   (f) Air pockets in suction line.
   (g) Stuffing-box packing worn or water seal plugged, allowing air to leak into the casing.
   (h) Air leaks into suction line.
   (i) Check valve installed incorrectly.
   (j) Water supply too low.
   (k) Strainer not submerged deeply enough.
   (l) Impeller damaged.
   (m) Casing gaskets defective.

2. **Not enough Pressure.**
   (a) Speed too low.
   (b) Air in water.
   (c) Impeller damaged.
   (d) Casing gaskets defective.

3. **Pump works for a while and then quits.**
   (a) Air leak in suction line.
   (b) Stuffing-box packing worn.
   (c) Air pocket in suction line.
   (d) Suction lift too high.

4. **Pump leaks excessively at stuffing-box.**
   (a) Packing is worn or not properly lubricated.
   (b) Packing is not properly inserted or run in.
   (c) Shaft or shaft sleeve is scored.

As a final note, I would like to remind users to make sure that the pump is rotating in the right direction as indicated by the arrow on the casing. Many beginner’s troubles have stemmed from attempts to run the pump in the reverse direction to that intended by the maker.
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