

Propeller pump and mixed flow pumps



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PROPELLER PUMP

Propeller pumps are efficient for application under high discharge and low head situations

MIXED FLOW PUMPS

mixed pumps are superior under medium head and high discharge situations

Propeller pump



- ❧ A propeller pump is specifically adopted to high discharge low head pumping.
- ❧ It is most suitable to lift water from canals, rivers and streams and in dewatering schemes. It has high efficiency under low head, specially within 2 meters.
- ❧ It can be used as portable units operated by light weight engines or in permanent installations using electric motor or engines.
- ❧ Portable engine operated propeller pumps have become very popular in the rice growing regions of south-east Asian countries.
- ❧ They have immense potential for adoption in the delta regions and command areas of India and in other countries.

Principle of operation



1. Propeller pumps are **axial flow pumps** in which the pressure head is developed mostly by the propelling or lifting action of the propeller blades on water.
2. The characteristics in the principles of operation of the pumping elements of the propeller pumps, as compared to radial flow pumps is explained below.
3. **Turbine pump-Strong centrifugal action**
4. **Mixed flow pump-Mild centrifugal action**
5. **Propeller pump-No centrifugal action.**



- ❧ The propeller pump develops most of its head by the lifting action of the impeller, with the flow entering axially, and discharging nearly axially into a guide case.
- ❧ These pumps are not popular in India.
- ❧ Only in Kerala they are used for drainage purpose.
- ❧ Jet pumps are suitable for high suction and low yield, where prime mover is to be located at the ground surface.

Operating characteristics of propeller pump



- ✧ The head capacity curve in a propeller pump is steeper compared to the centrifugal pump. A slight increase in the pumping head causes a large decrease in the quantity of water delivered.
- ✧ Therefore, it is necessary that the propeller pump be operated at the lower head as far as possible. The power requirement of a propeller pump is increased as the head is increased and the capacity is reduced.

Mixed flow pump



- ⌘ A mixed flow pump combines some of the features of both the vertical turbine pump and the propeller pump. It is applicable for high discharge medium head conditions.
- ⌘ The head usually varies from 3 to 10 metres.
- ⌘ Mixed flow pumps are extensively used for drainage pumping and in pumping from canals, rivers or streams. They are also popular in lift canal projects

Principle of operation



- ✧ In a mixed flow pumps , the head is developed partly by centrifugal force and partly by the lift of the vanes on the liquid.
- ✧ This type of pump always has a single inlet impeller. **The flow enters axially and discharges in an axial and radial direction.**
- ✧ Hence the name mixed flow pump.
- ✧ This may oil lubricated or water lubricated

Operating characteristics of mixed flow pump



- ∞ The head capacity of mixed flow pump is usually steeper than that of a centrifugal pump, but not as steep as that of a propeller pump.
- ∞ The horse power curve is almost constant .
- ∞ In such a situation, minimum change in pump capacity are possible through a wide variation in head, without danger of overloading the motor.