

# FRANKLIN AID



Franklin Electric



Franklin Application/Installation Data *Europe*

No. 1/2014

Based on frequently asked questions from the field, today's issue of Franklin AID will again cover the topic "upthrust operation".

## Explanation:

If a pump delivers more water than specified (see curve below), the impellers (depending on type of pump) will not apply further pressure, instead they will move up together with the pump shaft (Figure 1).

In the curve below, the operating point of the pump is very far to the right (Figure 2).

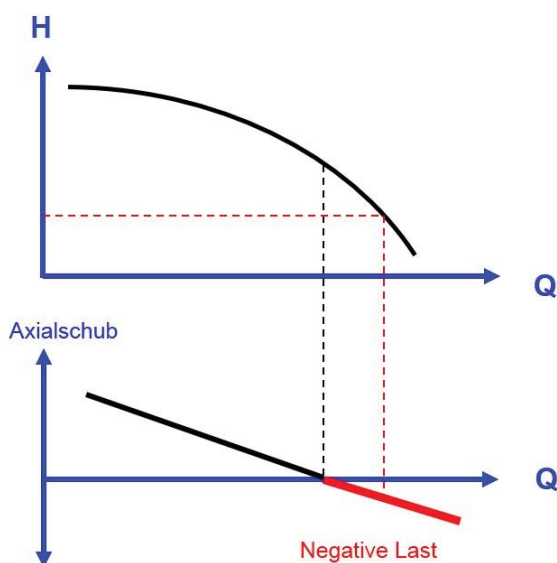


Figure 1:  
Negative axial thrust load

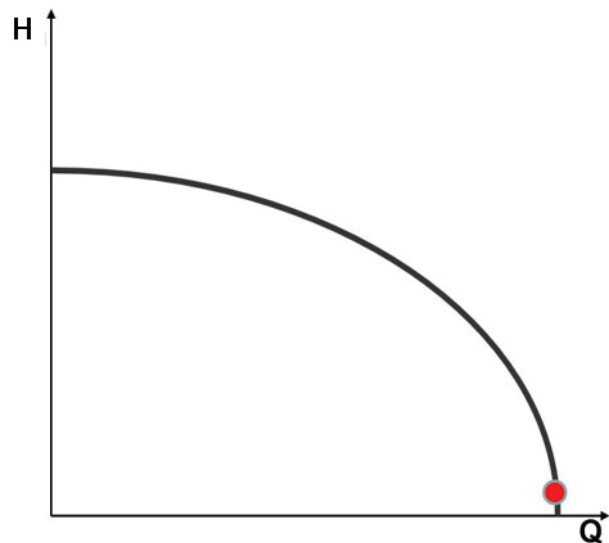


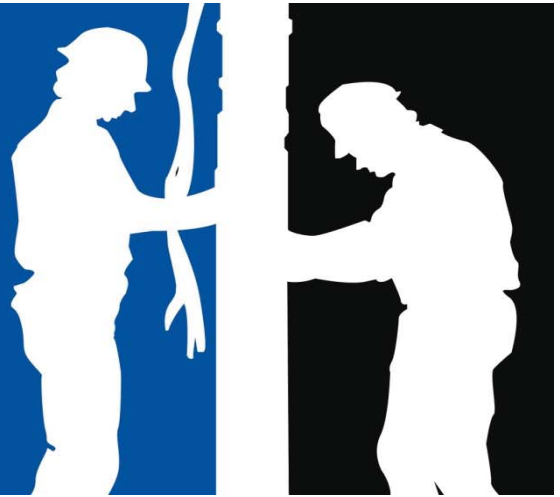
Figure 2:  
Operating point of the pump at end of the curve

In a correctly installed application, this will only happen once when the pump is first taken into service and the riser pipe is filled. During further operation the pipe remains filled with water by properly installed check valves in the line or by the non-return valve in the pump.

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Due to the friction-locked connection between pump coupling and motor shaft the upward movement of the pump shaft is also transferred to the rotor of the submersible motor. This may result in the rubbing of the upthrust washer.

Submersible motors can handle this upthrust for a limited time. Permanent upthrust operation will lead to the destruction of the upthrust washer as the constructional limits are exceeded.



Figure 3:  
New upthrust washer



Figure 4:  
Example of 6" Motor CT

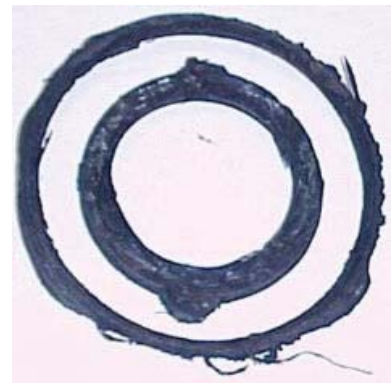


Figure 5:  
Destroyed upthrust washer

This can cause damage on both, the motor and the pump. In the event of damage, both components, motor as well as the pump, should be checked.

The abrasion of the upthrust washer will impair the lubrication of the radial and thrust bearings and can lead to damage.

An upthrust damage always indicates a system related cause.

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Experiences from the field show the following possible reasons:

- ❖ Leaking riser pipe
- ❖ Removed/drilled/leaking non-return valve of the pump
- ❖ Inappropriate pairing of pump to motor
- ❖ Over-pumping of the well (dry run)
- ❖ Other

In a properly carried out installation especially regarding non-return valves, an upthrust of the pump during start-up is limited to a minimum or even to zero.

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