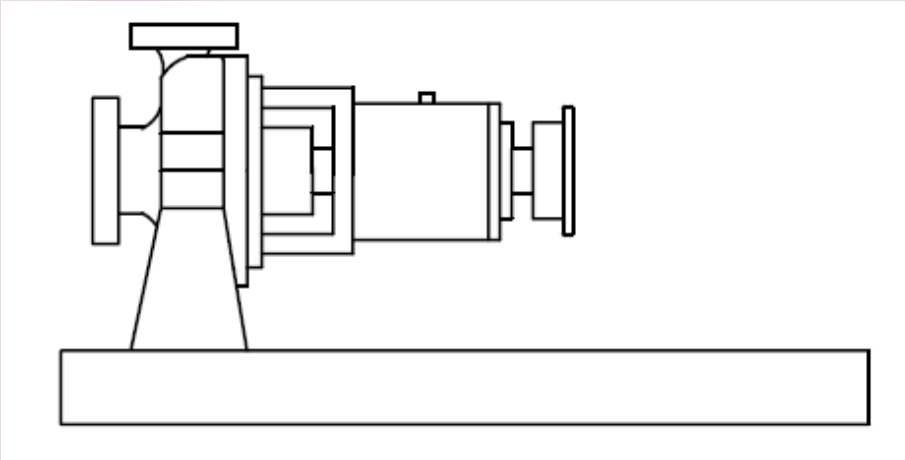
Pump selection – liquid characteristics

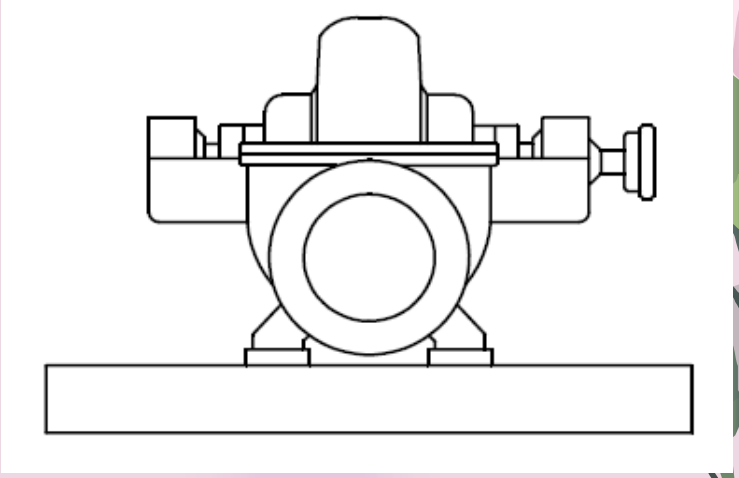
When a pump is selected according to the characteristic of the handling liquid, some might be noted.

1. Density ρ (g/cm^3)

When ρ is 0.7 or less, a pump with axially split casing might be avoided. In this case, a pump with radially split casing is preferable. When ρ is over 1.0, it is necessary to confirm strength of the power transmission part of shaft and impeller.



Axially split casing pump



Radially split casing pump

Pump selection – liquid characteristics

2. Saturated vapor pressure v_p

When v_p is changed large while temperature's changing a little as liquefied gas, it is necessary to note the cavitation because NPSHA becomes small when the liquid temperature rises. And it is necessary to examine whether flushing liquid should be cooled in the mechanical seal.

3. Specific heat c

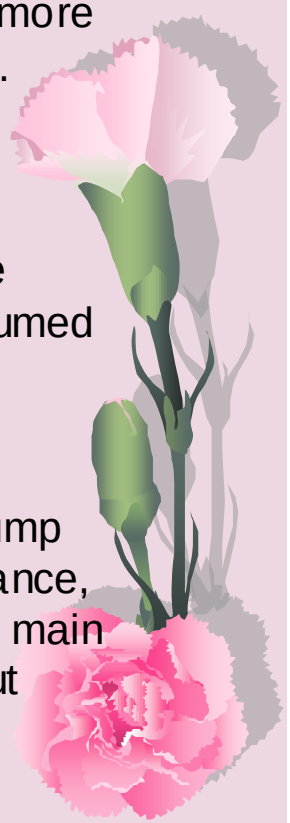
If the flow of pump is reduced, the liquid temperature rises. The smaller c is, the more the liquid temperature rises. When c is small, thermal minimum flow is increased.

4. Viscosity μ

In pump manufacturers, a performance test is done by using water at normal temperature. However, a pump treats not only water but also various liquids. The performance changes when μ is larger than water. How it changes can be presumed by ISO/TR 17766

5. Corrosion tendency

When there is no corrosion tendency in the handling liquid, the material of the pump uses the material that stands the maximum allowable working pressure , for instance, carbon steel. Recommended material is described in ISO 13709 and API 610 for main handling liquids. It is the best to use it if a material has been actually used without problems.



Pump selection – liquid characteristics

6. Slurry mixing or crystallization

Though the shape of wetted parts should designed simply when the slurry mixes, it cannot be designed easily. When it corresponds by the structure, semi-open impeller or full-open impeller is preferable. when corresponding by the material, materials such as with a hard-faced or soft rubber are used. The rotational speed should be lowered as much as possible.

Semi-open impeller

7. Hydrogen sulfide

The problem is not in austenitic stainless steel etc. when hydrogen sulfide mixes. When carbon steel is used, the hardness is reduced and the yield strength is reduced.