

Ideal fluid

Article to be checked

Check of this article is requested.

Suggested reviewer: Carmeljcaruana

TOO SHORT

This article was checked by pedagogue



This article was checked by pedagogue, but later was changed.



Fluid:

A fluid is a gas or liquid that, unlike a solid, flows to assume the shape of the container in which it is placed. This occurs because a fluid responds to a shear stress, or a force per unit area directed along the face of a cube of fluid, by flowing, rather than by an elastic displacement as in a solid.

PROPERTIES OF FLUID

1.DENSITY:

Density of a fluid is defined as the ratio of the mass of a fluid to its volume.

2.SPECIFIC VOLUME:

Specific volume of a fluid is defined as the volume of a fluid occupied by a unit mass or volume per unit mass of a fluid.

3.VISCOSITY OF LIQUID:

Viscosity is defined as the property of a fluid which offers resistance to the movement of one layer of fluid over another adjacent layer of fluid.

TYPES OF FLUIDS BASED ON VISCOSITY:

The fluids may be classified into following five types:

1. Ideal fluid
2. Real fluid
3. Newtonian fluid
4. Non-Newtonian fluid
5. Ideal plastic fluid

Ideal fluid

An ideal fluid is a fluid that has several properties including the fact that it is:

- Incompressible – the density is constant
- Irrotational – the flow is smooth, no turbulence
- Nonviscous –(Inviscid) fluid has no internal friction ($\eta = 0$)

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Ideal fluid do not actually exist in nature, but sometimes used for fluid flow problems.

2.Real fluid: Fluid that have viscosity($\mu > 0$) and their motion known as viscous flow.

All the fluids in actual practice are real fluids.

Fluid dynamics:

we use ideal fluid in 2 equations :

1. Continuity equation

2. Bernoulli equation

3. Newtonian Fluids:

A real fluid in which the shear stress is directly proportional to rate of shear strain (or velocity gradient).

4. Non-Newtonian Fluid:

A real fluid in which the shear stress is not proportional to the rate of shear strain.

5. Ideal Plastic Fluid:

A fluid in which shear stress is more than the yield value and shear stress is proportional to the rate of shear strain (or velocity gradient).

References

[1] [2]

1. <http://nptel.ac.in/courses/112104118/lecture-2/2-2-ideal-newtonian-non-newtonian.htm>
2. http://en.wikipedia.org/wiki/Perfect_fluid