

Distinguish, differentiate, compare and explain what is the difference between Free Surface and Pipe Flow. Comparison and Differences.

Difference between Free Surface and Pipe Flow

1. Open channel flow can be defined as a passage in which liquid flows with its upper surface exposed to atmosphere. A pipe is a closed conduit which is used for carrying fluids under pressure.
2. Open channel flow is due to gravity and its conditions are greatly influenced by slope of the channel. The flow in a pipe is termed as pipe-flow only when the fluid completely fills the cross section & there is no free surface of fluid.
3. In the first, the hydraulic grade line coincides with the water surface while in the other hydraulic grade line does not coincide with the water surface.
4. In the free surface maximum velocity occurs at a little distance below the water surface. In the pipe, maximum velocity occurring at the pipe center.
5. In the free surface shape of the velocity profile is dependent on the channel roughness while in the other the velocity distribution is symmetrical about the pipe axis.