FEATURES OF LAMINAR AND TURBULENT MOVEMENT OF FLUID FLOW.

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Annotation. Features of Laminar movement. Features of Turbulent movement. Nikuradze graph. Questions to repeat. Such a flow is called laminar if it slides one - to-one relatively within the boundary layer. We always see laminar flow in cases where the object size is small or the flow rate is low or the fluid viscosity is large. But when the body is large or it is moving at a great speed, and the viscosity of the liquid is small, it is a sign that there is a turbelent current if the liquid layers are intensifying with circular, jerky movements.

Keywords: adhesive, tension, solid, boundary layer, current, object, low speed, body, liquid.

We are looking for a current in a boundary layer that is closer to a solid surface where the adhesive voltages are of importance. Such a flow is called laminar if it slides one - to-one relatively within the boundary layer. We always see laminar flow in cases where the object size is small or the flow rate is low or the fluid viscosity is large. But when the body is large or it is moving at a great speed, and the viscosity of the liquid is small, it is a sign that there is a turbelent current if the liquid layers are intensifying with circular, jerky movements. Such vibrant currents are found in our lives in every step. We can see it in the snow, twisting in the wind, when the plane suddenly and sharply changes its movement, when the plane enters the "turbulent" zone in the air, when mixing the cream in the coffee, when opening the voodoo jumra to the end, at an uneven discharge of water. The Turbelent boundary layers are dust raised in the wind, we see near the hull of the ship floating on the smooth surface of the water in water piles close to the hull. Within and between the grooves, the fluid layers are in relative motion, with energy being expended to overcome the maxillary grooves formed by the adhesive stresses. The energy consumption within the turbulent flow is greater than in the laminar flow due to the high activity associated with the fluctuation of currents and velocities. Laminar flow is a calm state of flow for high kinematic viscosity in small sizes of low-velocity, physical bodies. In other words, Reynolds number is the state of the flow at small values. The Reynolds number is a dimensionless value defined as:

$$Re = \frac{\rho V D}{\mu} = \frac{V D}{\nu}$$

Where V is the velocity , D is the characteristic size (body length, pipe diameter, and x.k.). Turbulent flow is a large-scale flow of a physical body with a large velocity for low kinematic shear. That is, turbulent flow is the state of fluid flow at large values of the Reynolds number. Since the waste is low in laminar flow compared to turbulent flow, the difference between them is of great practical importance. Surface tension fluid properties on a free surface that form between a gas and a liquid are called Surface Tension. From observations, we know that the surface of the liquid has a reduction to a minimum of Sox, behaving as if its surface was pulled by a tense membrane. For example, the tiny droplets of the sprayed liquid are spherical in appearance, since the sphere has the smallest Surface for a given volume. Bone corneal drops acquire a spherical shape as a result of surface tension. And it cools down while it is flowing and hardens in a hole that holds that shape. It is also possible to observe Ham when the fur is wet. Some insects are able to walk freely on the surface of the water and swim freely on the surface of the water. The surface tension rod is isoxified by gravity between molecules. In terms of distance, the force decreases rapidly they are felt only at a short distance (5 x 10-6 m, that is, 5 μm). This distance is the radius of the sphere around the molecule.

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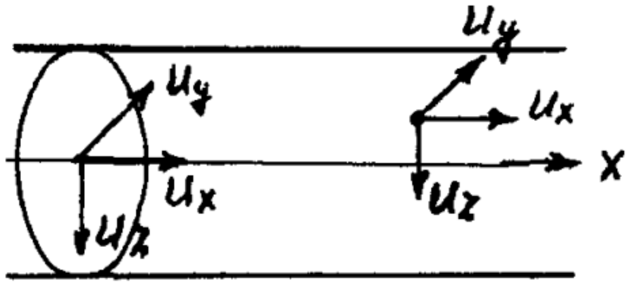
Only the molecules in this sphere focus on the center. The resultant force acting on molecules close to the surface attempts to make the surface as small as possible.

The surface tension coefficient of a liquid is a force that extends to the unit length of the surface. In Turbulent motion, fluid particles are manifested by interruption (pulsation) of speed and pressure at the expense of irregular movement, mixing with each other. Let the obtained arbitrary particle in the current be the one that changes the amount of its direction and the speed of its direction. The particle velocity at the point being seen with respect to the moment of present time is called the instantaneous local velocity. The instantaneous velocity of an arbitrary particle can be divided into 3 constituents: the first can be seen in the direction of the current, and the other two in a cross section that is transverse to the direction of the current.



A change in one of the instantaneous velocity organizers is called Velocity pulsation. A self-recording (samopisets) instrument is used, which is very sensitive when determining the velocity pulsation and recording its change at the point being viewed with respect to time. It is seen from the change in the velocity of the particle recorded through the instrument that it moves irregularly to be close to the average velocity obtained with respect to time . Such a phenomenon allows the inclusion of mean velocity for particles in the turbulent flow we are considering. The mean of the velocities found in sufficient time at a point considered the mean velocity of a particle is said to be, and can be expressed as:

$$\bar{u} = \frac{u_1\Delta t_1 + u_2\Delta t_2 + u_3\Delta t_3 + \ldots + u_n\Delta t_n}{T} = \frac{\sum_{i=1}^{n} u_i \Delta t_i}{T},$$

T is the total observed time period. The concept of average velocity introduced for a particle greatly alleviates the question of studying the structure of turbulent flow, and allows one to look at irregular (chaotic) motion as consisting of ordered, parallel flows. Therefore, to this action D.It would be possible to apply Bernoulli's equation.

In Turbulent flow, the continuous mixing of particles results in an excess friction force that is several tens of times greater than the friction force between the particles of the liquid you are doing in a laminar motion. Therefore, it is given for laminar movement.

$$\tau = \mu \frac{du}{dy}$$

can not apply. In general, the following expression can be used to find the friction force for turbulent flow:

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$$\tau = \mu \frac{du}{dy} + \rho l^2 \left(\frac{du}{dy} \right)^2 ,$$

in this case, the density of the fluid - the fluid;
L is the finite length of particle mixing;
dy du - velocity gradient;
dynamic viscosity of fluid - the coefficient of fluid.

According to the drawing made by the German scientist Prandtl, the main flow of turbulent movement in the pipe will be laminar flow in the turbulent core, and near the wall in the laminar layer, which is very thin.

So the higher the speed in the laminar layer, the less the thickness of the layer goes, and it can be said that large Reynolds numbers do not have at all. At the expense of the roughness of the inner walls of the pipe, a rapidly changing movement is formed in the boundary layer, which also affects the flow of the main core, where it begins to fade slowly. The fluid acting on the main nuclear axis also moves transversely from the pulsation effect in one time. As a result of this, particles of liquids mix, and the velocities of the current in the core calm down. The average velocities obtained for turbulent motion across the cross section are strictly (suhestvenno) different from the distributed velocities of laminar flow.

If the laminar and turbulent motion velocities are compared, the rate of distribution relative to the laminar in turbulent motion is flatter, while the velocity in the layer close to the wall increases rapidly. The velocity distributed over the arbitrary cross-sectional surface obtained for turbulent motion in a pipe is represented by the following equation:

The lost dam found for fluid acting turbulently differs from the lost dam in laminar motion. If the dam lost longitudinally in laminar motion is proportional to the first degree of mean velocity, i.e. linearly connected, a jump is generated at the expense of a sudden increase in resistance while moving to turbulent motion. In turbulent motion, however, the lost dam begins to grow rapidly, and it is similar to the line of the parabola, that is, a link to the second level of speed. The dilution-gan dam in the pipe can be expressed in terms of the connection with the mean velocity. If the Reynolds numbers for turbulent motion are negligible and the value of the roughness, inertial voltages are in one order, the full urination voltage is less proportional to the second level of the velocity gradient. The expression Darsiveysbach is used primarily for laminar and turbulent motion in detecting lost dam. Where the Laminar motion has only a link to the Reynolds number, the turbulent motion will also depend on the inner thunder of the pipe wall with the Reynolds number. One of the main peculiarities of Gadir-budurlik is absolute Gadir-budurlik, which is measured in units of length and is equal to the average value of ulchovs, which protrude from the inner wall of the pipe and are uneven.

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